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Review of the genus *Engyprosopon* Günther, 1862 (Pleuronectiformes: Bothidae) from waters off Taiwan, with descriptions of two new species

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Abstract

Species of the bothid genus *Engyprosopon* Günther, 1862 from the waters off Taiwan are reviewed. Nine species are recognized and described. Of the nine species, *E. grandisquama* (Temminck & Schlegel, 1846), *E. multisquama* Amaoka, 1963 and *E. maldivense* (Regan, 1908) previously known from Taiwan are confirmed, whereas *E. xystrius* Hubbs, 1915, *E. mogkii* (Bleeker, 1854), *E. longipelvis* Amaoka, 1969 and *E. mozambicense* Hensley, 2003 represent new records for Taiwan. Moreover, two further species are described new to science. *Engyprosopon brevifrontale* sp. nov. is characterized by a deep and short body, large eyes situated close to the head margin, 0 + 9–10 smooth gill rakers, strong rostral and upper orbital spines on the ocular side, small rostral spine on the blind side, and a dark blue peritoneum. *Engyprosopon parvipectoralis* sp. nov. is characterized by the combination of serrate gill rakers, large head (3.1–3.4 in SL); extremely narrow or almost ridge-like interorbital in both sexes; ocular-side pectoral fin distinctly short (1.4–1.6 in HL) in both sexes; and no rostral or orbital spines in either sex. Detailed descriptions and a key to all of the species of *Engyprosopon* recorded from the waters off Taiwan are provided.

Key words: taxonomy, Pisces, Taiwan, *Engyprosopon brevifrontale* sp. nov., *Engyprosopon parvipectoralis* sp. nov.

Introduction

Engyprosopon is the largest genus of the Bothidae with about 26 valid species, which are widely distributed in tropical and temperate regions of the Indo-Pacific Ocean. The species usually occur in waters shallower than 50 m. The genus is defined by the following characters: ovoid body, large ctenoid scales on the ocular side with a row of feeble and short ctenii, caudal skeleton with deeply branched parhypural and 3 hypurals, and in most species, sexual dimorphism in interorbital width, pectoral fin length, snout and orbital spines, sometimes orbital flaps, and coloration of the blind side of the body (Amaoka *et al.*, 1993).

Only three species of *Engyprosopon* had been previously documented from the waters around Taiwan: *E. grandisquama*, *E. multisquama* and *E. maldivense* (Oshima, 1927; Chen & Weng, 1965; Shen, 1983; Shen *et al.*, 1993; Shen & Wu, 2012).

While conducting research over the past three years (2014–2017) on the pleuronectiforms of Taiwan, we found nine species of *Engyprosopon* in collections of the National Museum of Marine Biology and Aquarium (NMMB-P) and Academia Sinica, Institute of Zoology (ASIZP), and National Taiwan University Museum (NTUM), and among new specimens collected from fish markets around Taiwan. Among these were two undescribed species and four new records for other species from the waters off Taiwan.

In this paper we describe the two new species and redescribe the other seven, based on these new specimens as well as material in collections. Photographs and a key are provided for all nine species.

Methods and materials

Counts and measurements follow those of Hubbs & Lagler (1974) and Amaoka *et al.* (1993). Gender of scientific names follows Nakabo & Hirashima (2015). Proportional measurements are expressed as proportions of standard length (SL) and head length (HL) in the text, and as percentages of SL and HL in Tables 1–2.

Specimens examined are housed in the fish collection of the National Museum of Marine Biology and Aquarium (NMMB-P) and in the Research Museum of Biodiversity Research Center, Academia Sinica (ASIZP). New specimens were collected from various fish markets around Taiwan and preserved in 75% ethanol or 50% isopropyl alcohol after fixation in 5% Formalin. The number of vertebrae and features of the caudal skeleton were examined from digital radiographs (Digital X-ray machine provided by NMMBA). Comparative specimens were used when only one specimen from waters off Taiwan was available for examination. Data and characters of comparative specimens are shown in parenthesis.

Institutional abbreviations follow those listed in Eschmeyer *et al.* (2018, online version).

Taxonomy

Family Bothidae

Genus *Engyprosopon* Günther, 1862

Engyprosopon Günther, 1862:431 (type species: *Rhombus mogkii* Bleeker, 1854).

Scæops Jordan & Starks, 1904:627 (type species: *Rhombus grandisquama* Temminck & Schlegel, 1846).

Diagnosis. Body shallow to deeply ovate. Anterior tip of isthmus ventral to middle of lower eye. A strong, or feeble (rarely absent) rostral spine in males; rostral spine feeble or absent in females and juveniles of both sexes. Anterior margin of head steeper in mature males than in females and juveniles, or rarely with the same profile in both sexes. Interorbital space wide to narrow, concave (to almost ridge-like), becoming wider with growth, and wider in males than in females and juveniles. Mouth usually moderate or sometime large in size, upper jaw length on ocular side 2.0–3.6 in HL. Teeth on upper jaw uniserial or biserial; teeth uniserial on lower jaw.

Scales ctenoid on ocular side with row of feeble ctenii along apical margin; scales cycloid on blind side; 36–61 scales in lateral line. Lateral line on ocular side curved above pectoral fin, absent on blind side. Dorsal-fin origin on blind side anterior to dorsal margin of lower eye. Anal-fin origin below anterior base of ocular-side pectoral fin. Pelvic fin on ocular side originating at tip of isthmus, that on blind side equal to third to fifth fin ray on ocular side. Anus on blind side, just anterior to origin of anal fin; urogenital pore on ocular side, opposite to vent. Caudal skeleton of four plates including a parhypural and three hypurals, all with deep clefts from their distal margins to near their bases.

Remarks. *Engyprosopon* shares many characters with *Asterorhombus* including the cleft parhypural and three hypurals. Members of *Engyprosopon* have been distinguished from specimens of the latter genus by having sexual differences in interorbital width, length of the ocular-side pectoral fin, presence of a rostral spine, and sometimes an orbital spine and orbital flap, and by differences in body coloration on the blind side (Amaoka *et al.*, 1993). However, Hensley (2005) found that sexes of *Asterorhombus filifer* differ in interorbital width. In this paper, no sexual differences in the interorbital width and the coloration on the blind side were found for *Engyprosopon mogkii* or *E. parvipectoralis* sp. nov. Based on these results, these two genera cannot be definitely separated by presence or absence of these sexual characters. Therefore, *Engyprosopon* can be clearly distinguished from *Asterorhombus* only in lacking a lure on the first dorsal-fin ray and in lacking palmate gill rakers, both features that characterize species of *Asterorhombus*.

Key to species of *Engyprosopon* found in waters around Taiwan

| | | |
|-----|---|---|
| 1a. | Gill rakers without spinules on their inside edges; ocular-side lower jaw 2.0–2.5 in HL | 2 |
| 1b. | Gill rakers with spinules on their inside edges; ocular-side lower jaw 1.5–2.0 in HL | 7 |

| | | |
|-----|--|------------------------------------|
| 2a. | Distal half of caudal fin with a pair of large, distinct blackish blotches | 3 |
| 2b. | Distal half of caudal fin without blackish blotches | 5 |
| 3a. | Gill rakers 0 + 13 (0–6 + 13–18 in comparative specimens) | <i>E. xystrias</i> |
| 3b. | Gill rakers 0–3 + 5–11 | 4 |
| 4a. | Body ovate, its depth 1.63–1.86 in SL; ocular-side pectoral-fin rays not filamentous, usually shorter than head length | <i>E. grandisquamis</i> |
| 4b. | Body rather elongate, its depth 1.87–2.03 in SL; ocular-side pectoral-fin rays filamentous, longer than head length | <i>E. multisquamis</i> |
| 5a. | Interorbital width very narrow, its width 7.8–12.5 in HL; scales 50–51 in lateral line; gill rakers 0 + 6–8 | <i>E. mogkii</i> |
| 5b. | Interorbital width very wide, its width 1.7–3.9 in HL; scales 43–48 in lateral line; gill rakers 0–3 + 8–11 | 6 |
| 6a. | Small eyes placed away from head margin (Fig. 8), upper eye diameter 3.1–4.0 in HL; depth of caudal peduncle 1.8–2.1 in HL; body depth 1.8–2.1 in SL | <i>E. maldiveense</i> |
| 6b. | Large eyes placed near to head margin (Fig. 10), upper eye diameter 2.7–2.9 in HL; depth of caudal peduncle 2.2–2.3 in HL; body depth ~1.7 in SL | <i>E. brevifrontale</i> sp. nov. |
| 7a. | Scales 37–40 in lateral line; ocular-side pelvic-fin rays elongate in males, 1.7–1.8 in HL; fin membrane of ocular-side pelvic fin with many black spots in males | <i>E. longipelvis</i> |
| 7b. | Scales 46–52 in lateral line; ocular-side pelvic-fin rays not elongate in either sex, 1.9–3.0 in HL; fin membrane of ocular-side pelvic fin without many black spots in either sex | 8 |
| 8a. | Eyes separated by narrow, concave interorbital space in both sexes; eyes large, upper eye diameter 3.0–3.5 in HL; anterior teeth on upper jaw not enlarged; blind side of body dark in males | <i>E. mozambiquense</i> |
| 8b. | Eyes nearly contiguous, separated by extremely narrow interorbital space, almost filled entirely by a bony ridge in both sexes; eyes small, upper eye diameter 3.8–4.3 in HL; anterior teeth on upper jaw enlarged, canine-like; blind side of body not dark in either sex | <i>E. parvipectoralis</i> sp. nov. |

Engyprosopon xystrias Hubbs, 1915

Figure 1; Table 1

Engyprosopon xystrias Hubbs, 1915: 475 (type locality: Vincennes Strait, Japan, 30°12'N, 130°43'40"E, 83 fathoms [151.8 m]). Norman, 1934:211; Okada & Matsubara, 1938:422; Matsubara, 1955:1259; Amaoka, 1969:87; Amaoka *et al.*, 1993:385.

Material examined. NMMB-P22216, male, 88.7 mm SL, Ke-tzu-Liao, Kaohsiung, southwestern Taiwan, 9 Mar. 2015. **Other localities:** FAKU 26177, male, 87.1 mm SL and FAKU 26451, male, 73.0 mm SL, Kagoshima Pref., 9–28 Aug. 1956; HUMZ 124863, male, 67.0 mm SL, 22°38.2'S, 167°34.8'E, New Caledonia, 105–110 m, 9 Sep. 1989; MNHN 1993-0025, male, 60.0 mm SL, 22°31.7'S, 167°32.4'E, New Caledonia, 150–155 m, 9 Sep. 1989; MNHN 1993-0024, male, 52.1 mm SL, and HUMZ 124862, female, 51.5 mm SL, 21°06.00'S, 167°26.20'E, Loyalty Islands, 200–240 m, 20 Feb. 1989; MNHN 1993-0023, 2 males, 47.1–66.8 mm SL, 20°00.20'S, 158°46.60'E, Chesterfield and Bellona Plateaus, 225 m, 27 July 1984.

Diagnosis. Gill rakers 0–6 + 13–18; anterior margin of head anterior to both eyes with about 4–5 pale blotches margined by dark bands; scales on front margin of head more strongly ctenoid and non-deciduous compared to body scales.

Description. Dorsal-fin rays 92 (88–98, from other localities), anal-fin rays 65 (60–77), ocular-side pectoral-fin rays 12 (12–13), blind-side pectoral-fin rays 9 (10–12), caudal-fin rays 3 + 11 + 3 (3 + 11 + 3), ocular-side pelvic-fin rays 6 (6), blind-side pelvic-fin rays 6 (6), scales in lateral line 40 (39–50), gill rakers 0 + 13 (0–6 + 13–18), vertebrae 10 + 26 (10 + 25–27).

In SL (* = mean data not available): HL 3.81 (3.60–4.07, from other localities), body depth 2.03 (1.94–2.10). In HL: snout 4.66 (4.37–5.48), upper eye diameter 2.95 (2.41–3.04), lower eye diameter 2.91 (2.49–2.98), interorbital width 2.65 (2.43–7.88), ocular-side upper jaw 2.95 (2.51–3.00), blind-side upper jaw 2.91 (2.56–3.00), ocular-side lower jaw 2.43 (2.03–2.33), blind-side lower jaw 2.33 (2.03–2.30), caudal peduncle depth 2.40 (2.08–2.62), ocular-side pectoral fin 1.18 (1.0–1.14), blind-side pectoral fin 2.43 (1.99–2.58), ocular-side pelvic fin 3.07 (2.50–2.95), blind-side pelvic fin 2.43 (2.62–3.32), base of ocular-side pelvic fin 3.53 (2.61–3.00), base of blind-side pelvic fin 8.32 (8.20–9.69), longest dorsal-fin ray * (1.71–2.04), longest anal-fin ray * (1.70–2.25), middle caudal-fin ray 1.35 (1.09–1.20).

Body moderately ovate, deepest in anterior 1/3, its depth about 1/2 of body length; dorsal and ventral contours almost symmetrical, with gradual taper posteriorly. Caudal peduncle less than 1/4 of body depth. Head large, its length more than 1/4 of SL; upper profile of head with small concavity anterior to upper margin of lower eye. Snout short, much shorter than eye diameter. Rostral spine present in males (absent in females and juveniles in

comparative specimens). Eyes large, lower eye diameter about equal to maxilla length; lower eye in advance of upper eye. No orbital spine in both sexes. Interorbital space widely concave in males (distinct sexual or ontogenetic differences in its width in comparative specimens). Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril a short tube with a small triangular flap posteriorly, posterior nostril not tubular and without flap; nostrils on blind side closely set below origin of dorsal fin, similar in shape to those on ocular side.

Mouth rather large, oblique, maxilla extending to below anterior portion of lower eye; anterior tip of upper jaw extending slightly beyond tip of lower jaw when mouth closed. Teeth on upper jaw biserial, those in outer series larger and more widely spaced than those in inner row, some canine-like teeth anteriorly; lower jaw teeth conical and uniserial, nearly similar in size to anterior teeth of upper inner row. Gill rakers on first arch slender and slightly pointed or rounded at tip, inside edge smooth, no gill rakers on upper limb (0–6 in comparative specimens). Ocular-side scales ctenoid with short ctenii, large and deciduous; scales on anterior margin of head more strongly ctenoid than those on body, and not deciduous; tips of both jaws and tip of snout on ocular side naked; cycloid scales on blind side of body.



FIGURE 1. *Engyprosopon xystrias* Hubbs, 1915. NMMB-P22216, male, 88.7 mm SL. A. ocular side, B. blind side.

Dorsal- and anal-fin rays without elongate rays, very easily broken. Ocular-side pectoral-fin rays short in both sexes, equal to or slightly shorter than head length; ocular-side pectoral fin about 2 times length of blind-side pectoral fin. Ocular-side pelvic-fin origin at tip of isthmus, ocular-side fifth fin ray opposite to first ray of blind-side fin. Tip of isthmus nearly reaching vertical line through middle of lower eye. Caudal-fin rays branched except for three upper- and three lowermost fin rays.

Coloration in alcohol. Body pale brown; anterior margin of head before both eyes with 4–5 pale blotches margined by dark bands; one obtuse dark spot on middle of straight section of lateral line; ocular-side pectoral fin with some dark bands; middle of caudal fin between third and fifth fin rays counted from uppermost and lowermost fin rays with pair of large jet-black blotches. Blind side of body dark except for head in males (yellowish white in females and juveniles). All fins on both sides dark brown with many dark spots; blind-side paired fins uniformly yellowish white.

Sexual dimorphism. This species shows sexual dimorphism only in interorbital width, presence of a rostral spine, and coloration on the blind side of the body.

Distribution. Widespread in the western Pacific Ocean, from southern Japan, Taiwan, South China Sea to Coral Sea and Saya de Malha Bank in the Western Indian Ocean. Bathymetric range 30–240 m (Hensley & Amaoka, 2001).

Remarks. This species is characterized in having a pair of black blotches on the caudal fin and numerous gill rakers on the lower limb of the first gill arch. This specimen collected off southwestern Taiwan represents the first record from waters off Taiwan, though it was known from off southern Japan and the South China Sea (Amaoka *et al.*, 1993).

***Engyprosopon grandisquama* (Temminck & Schlegel, 1846)**

Figures 2–3; Table 1

Rhombus grandisquama Temminck & Schlegel, 1846:183, figs. 3–4 (type locality: Nagasaki, Japan).

Rhombus poecilurus Bleeker, 1852:293 (type locality: Ambon Island, Molucca Islands, Indonesia).

Rhomboideichthys grandisquama: Günther, 1862:437.

Platophrys (Arnoglossus) poecilurus: Bleeker, 1870–75:13, pl.5, fig.1.

Rhomboideichthys spilurus Günther, 1880:47, pl. 21, fig. A (type locality: South of New Guinea, Zebu, 28 fathoms [51 m]).

Rhomboideichthys spiniceps Macleay, 1881:127 (type locality: Port Jackson, New South Wales, Australia).

Scaeops grandisquama: Jordan & Starks, 1904:627, pl. 8, fig. 2.

Scaeops poecilurus: Jordan & Seale, 1905:803.

Scaeops orbicularis Jordan & Seale, 1907:45 (type locality: Cavite, Luzon Island, Philippines). Oshima, 1927:179.

Engyprosopon grandisquama: Norman, 1926:250; Norman, 1934:209, fig. 156; Chen & Weng, 1965:48, fig. 32; Amaoka, 1963:108; Amaoka, 1969:143; Shen, 1983:20, fig. 25; Amaoka *et al.*, 1993:385, fig. 2; Shen, 1993:569, pl. 19–7; Hensley & Amaoka, 2001:3823; Shao *et al.*, 2008:264; Ho *et al.*, 2009:10; Shen & Wu 2012:751, 2 figs.

Material examined. NMMB-P22233, 1 male, 82.5 mm SL, 11 Mar. 2015; NMMB-P22235, 4 males, 67.5–78.9 mm SL, 11 Feb. 2015; NMMB-P22302, 3 females, 65.7–72.6 mm SL, 28 Mar. 2015; NMMB-P22298, 1 male and 1 female, 70.2–72.0 mm SL, 28 Mar. 28 2015; all collected from Ke-tzu-liao, Kaohsiung, southwestern Taiwan at depths less than 100 m.

Diagnosis. Body deeply ovoid; caudal fin with a pair of black blotches, arranged between the third and fourth fin rays from upper- and lowermost rays in the fin; ocular-side pectoral fin not elongate, and without sexual differences in its length; gill rakers very short, not serrate.

Description. Dorsal-fin rays 81–87, anal-fin rays 61–65, ocular-side pectoral-fin rays 10–12, blind-side pectoral-fin rays 8–10, caudal-fin rays 3 + 11 + 3, ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales 40–45 in lateral line, gill rakers 0 + 5–7, vertebrae 10 + 14.

In SL: HL 3.65–4.16, body depth 1.63–1.86. In HL: snout 4.61–5.89, upper eye diameter 2.66–3.32, lower eye diameter 2.69–3.43, interorbital width 2.52–3.47 in males, 4.57–5.31 in females, ocular-side upper jaw 3.07–3.49, blind-side upper jaw 3.12–3.55, ocular-side lower jaw 2.21–2.41, blind-side lower jaw 2.02–2.29, caudal peduncle depth 1.74–2.14, ocular-side pectoral fin 1.01–1.04 in males, 1.03–1.14 in females, blind-side pectoral fin 1.72–2.04, ocular-side pelvic fin 2.05–2.76, blind-side pelvic fin 2.03–2.44, base of ocular-side pelvic fin 2.17–2.73, base of blind-side pelvic fin 5.72–8.14, longest dorsal fin ray 1.77–2.02, longest anal fin ray 1.69–2.14, middle caudal fin ray 1.02–1.26.

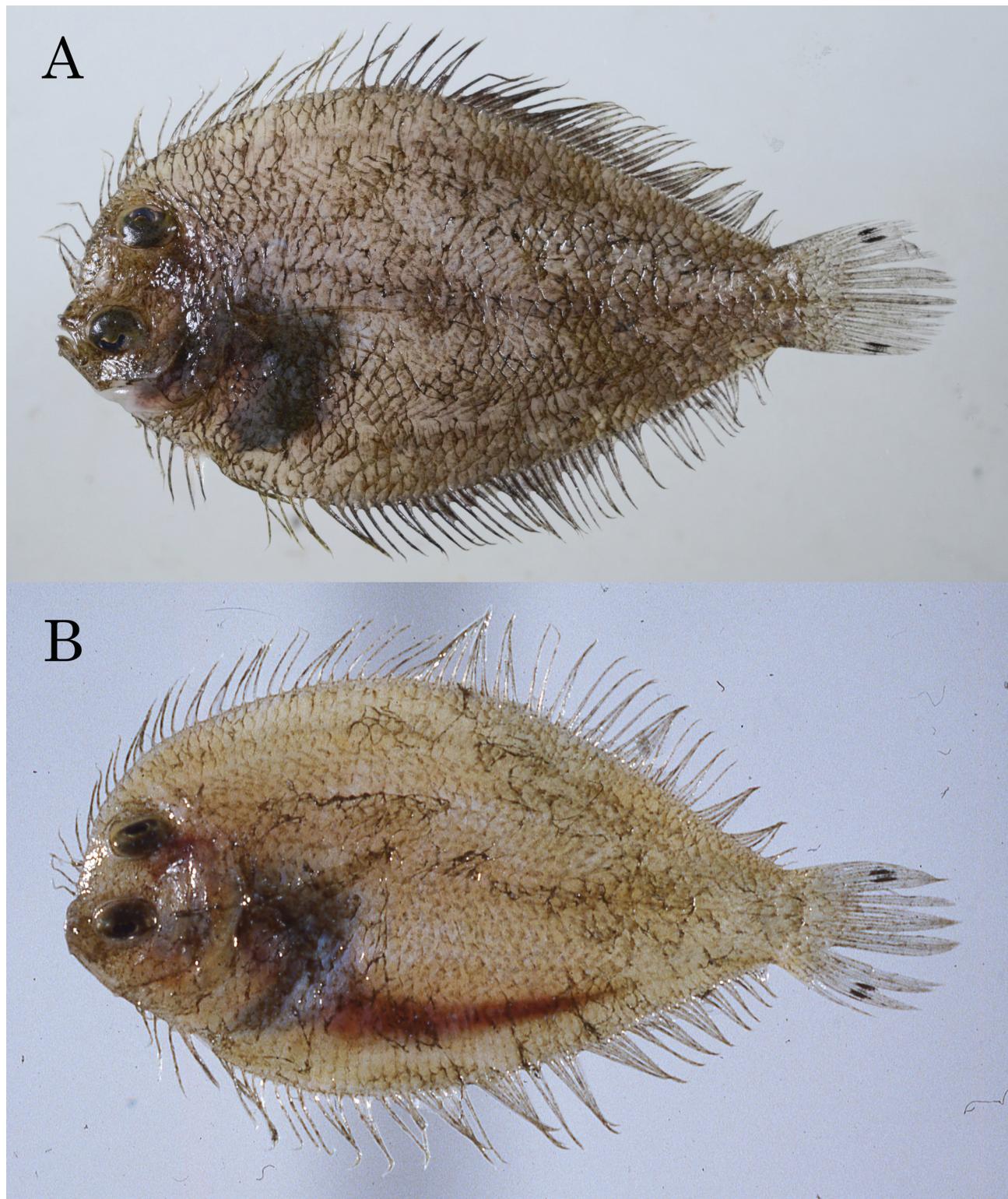


FIGURE 2. *Engyprosopon grandisquama* (Temminck & Schlegel, 1846). Ocular side, A. NMMB-P22235, male, 74.7 mm SL. B. NMMB-P22302, female, 72.6 mm SL.

Body deeply ovate, short, body depth greatest at about middle of body, usually equal to more than 1/2 of SL; dorsal and ventral contours almost symmetrical; except for steep anterior profile of head. Caudal peduncle less than 1/4 of body depth. Head small, its length about 1/4 of SL; upper profile of head with distinct concavity anterodorsal to dorsal margin of lower eye; anterior profile steep, nearly vertical in mature males, less so in females and juveniles. Snout short, much shorter than eye diameter. Ocular-side rostral spine present, with round tip in males, rostral spine absent or feeble in females and juveniles. Eyes small, diameter sub-equal to upper jaw length; lower

eye slightly in advance of upper eye. No orbital spine in either sex. Interorbital space wide and deeply concave, distinct sexual and ontogenetic differences in width of interorbital space, with males having a wider space than that of females and juveniles. Ocular-side nostrils anterior to upper margin of lower eye; anterior nostril tubular with wide flap posteriorly, posterior nostril a rudimentary tube with a short flap; nostrils on blind side very small, closely set below origin of dorsal fin.

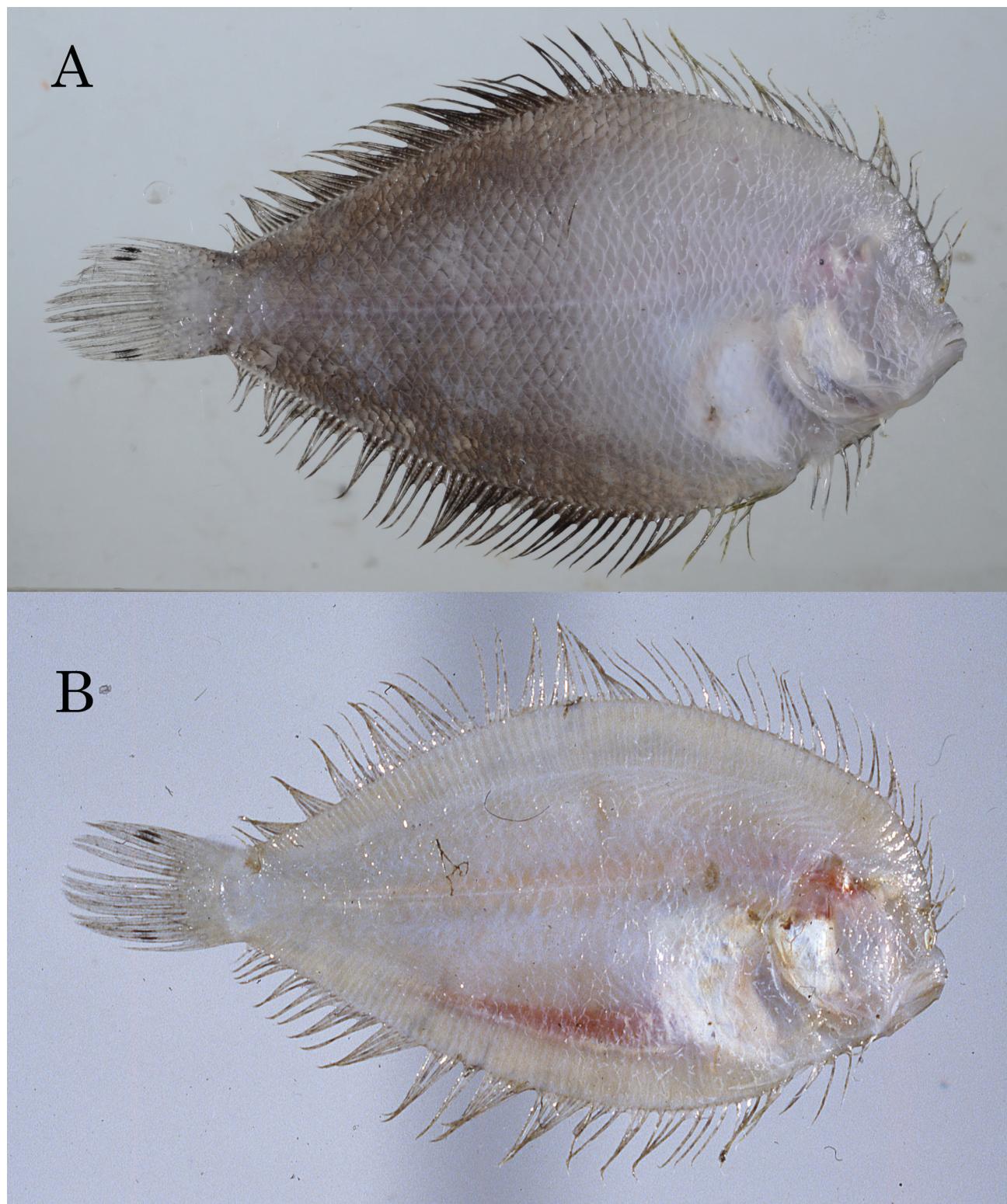


FIGURE 3. *Engyprosopon grandisquama* (Temminck & Schlegel, 1846). Blind side, same specimens as those in Figure 2.

Mouth rather small, oblique; maxilla extending ventroposteriorly to below or a little beyond anterior margin of lower eye; anterior tips of both jaws about on same vertical line when mouth closed; rather large, obtuse knob at mandibular symphysis. Teeth on upper jaw biserial, those in outer series larger, stouter, and wider apart than those in inner series; lower jaw teeth uniserial, conical, close-set, curved, almost same size as upper inner teeth. Gill rakers on first arch short and rounded at tip, inside edge not serrate; no gill rakers on upper limb. Ocular-side scales ctenoid with short ctenii; large and greatly deciduous; tips of both jaws and of ocular-side snout naked; scales cycloid on blind side of body.

Dorsal-fin origin on blind side at concavity on head; anal-fin origin ventral to pectoral fin base; both fins without elongate rays. No elongate ocular-side pectoral-fin rays in either sex, but rays of males slightly longer than those of females; blind-side pectoral fin short. Origin of ocular-side pelvic fin at tip of isthmus; space between ocular-side fourth and fifth pelvic-fin ray opposite to first ray of blind-side fin; anterior margin of first ray without skin flap. Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched except for three upper- and three lowermost rays. Tip of pelvic bone extruded anterior to anal-fin origin.

Coloration in alcohol. Ocular side of body uniformly dark greenish without any distinct markings; numerous tiny dark spots before interorbital space; caudal fin with pair of large black blotches arranged between third to fourth fin rays from uppermost and lowermost fin rays, respectively; all fins uniformly dark; blind side of body, except on anterior half, with dark pigment in males; blind side of body uniformly yellowish-white in females.

Sexual dimorphism. This species shows sexual dimorphism in slope of the anterior margin of the head, in interorbital width, presence or absence of a rostral spine, length of the ocular-side pectoral fin, and in coloration on the blind side of the body.

Distribution. Widespread in the Indo-West Pacific Ocean, from East Africa and throughout the Indian Ocean to the Indo-Australian Archipelago and New Caledonia, north to southern Japan. Bathymetric range 7–200 m (De Bruin *et al.*, 1995), commonly collected at depths less than 100 m off Taiwan.

Remarks. This species resembles *E. multisquama* in having a pair of black blotches on the caudal fin. It is easily distinguished from the latter in having small black blotches between the third and fourth caudal fin rays, its rather deep body, non-elongate ocular-side pectoral fin, fewer lateral-line scales, and by its somewhat fewer meristic values.

Engyprosopon multisquama Amaoka, 1963

Figures 4–5; Table 1

Engyprosopon multisquama Amaoka, 1963:111, fig. 3 (type locality: Susaki, Kochi Prefecture, Japan). Amaoka, 1969:146, fig. 47; Shen, 1983:20, fig. 26; Shen, 1993:569, pl. 19-9; Shao *et al.*, 2008:264; Shen & Wu, 2012:751, 2 figs.

Material examined. NMMB-P8852, male, 89.5 mm SL, Penghu, Taiwan, 30 Aug. 2005; NMMB-P8859, male, 87.5 mm SL, Penghu, Taiwan, 27 Oct. 2005; NMMB-P14467, 2 females, 73.1–75.3 mm SL, Chie-din, Kaohsiung, Taiwan, 1 Nov. 2001. NMMB-P22258, 2 males, 82.0–97.0 mm SL, Ke-tzu-liao, Kaohsiung, Taiwan, 11 Mar. 2015; NMMB-P22245, 1 females, 91.7 mm SL, Ke-tzu-liao, Kaohsiung, Taiwan, 11 Feb. 2015; NMMB-P22770, 3 males, 83.3–92.3 mm SL, Chie-din, Kaohsiung, Taiwan, 50 m, 1 Nov. 2015.

Diagnosis. Caudal fin with a pair of black blotches, arranged between the second and fourth fin rays from the uppermost and lowermost fin rays in this fin; ocular-side pectoral fin with greatly elongate filament, longer in males than females; gill rakers not serrate.

Description. Dorsal-fin rays 89–98, anal-fin rays 68–75, ocular-side pectoral-fin rays 10–12, blind-side pectoral-fin rays 9–10, caudal-fin rays 3 + 11 + 3, ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales 45–50 in lateral line, gill rakers 0 + 6, vertebrae 10 + 25–26.

In SL: HL 3.75–4.36, body depth 1.83–2.03. In HL: snout 4.67–5.25, upper eye diameter 3.27–3.92, lower eye diameter 3.26–3.87, interorbital width 3.75–5.66 in males, 6.99–8.76 in females, ocular-side upper jaw 2.94–3.18, blind-side upper jaw 2.90–3.18, ocular-side lower jaw 2.11–2.38, blind-side lower jaw 1.96–2.13, caudal peduncle depth 1.82–2.22, ocular-side pectoral fin 0.48–0.72 in males, 0.95–1.11 in females, blind-side pectoral fin 1.70–1.94, ocular-side pelvic fin 1.75–2.33, blind-side pelvic fin 2.01–2.85, base of ocular-side pelvic fin 2.16–2.59, base of blind-side pelvic fin 5.08–7.86, longest dorsal fin ray 1.73–2.28, longest anal fin ray 1.71–2.07, middle caudal fin ray 1.01–1.16.

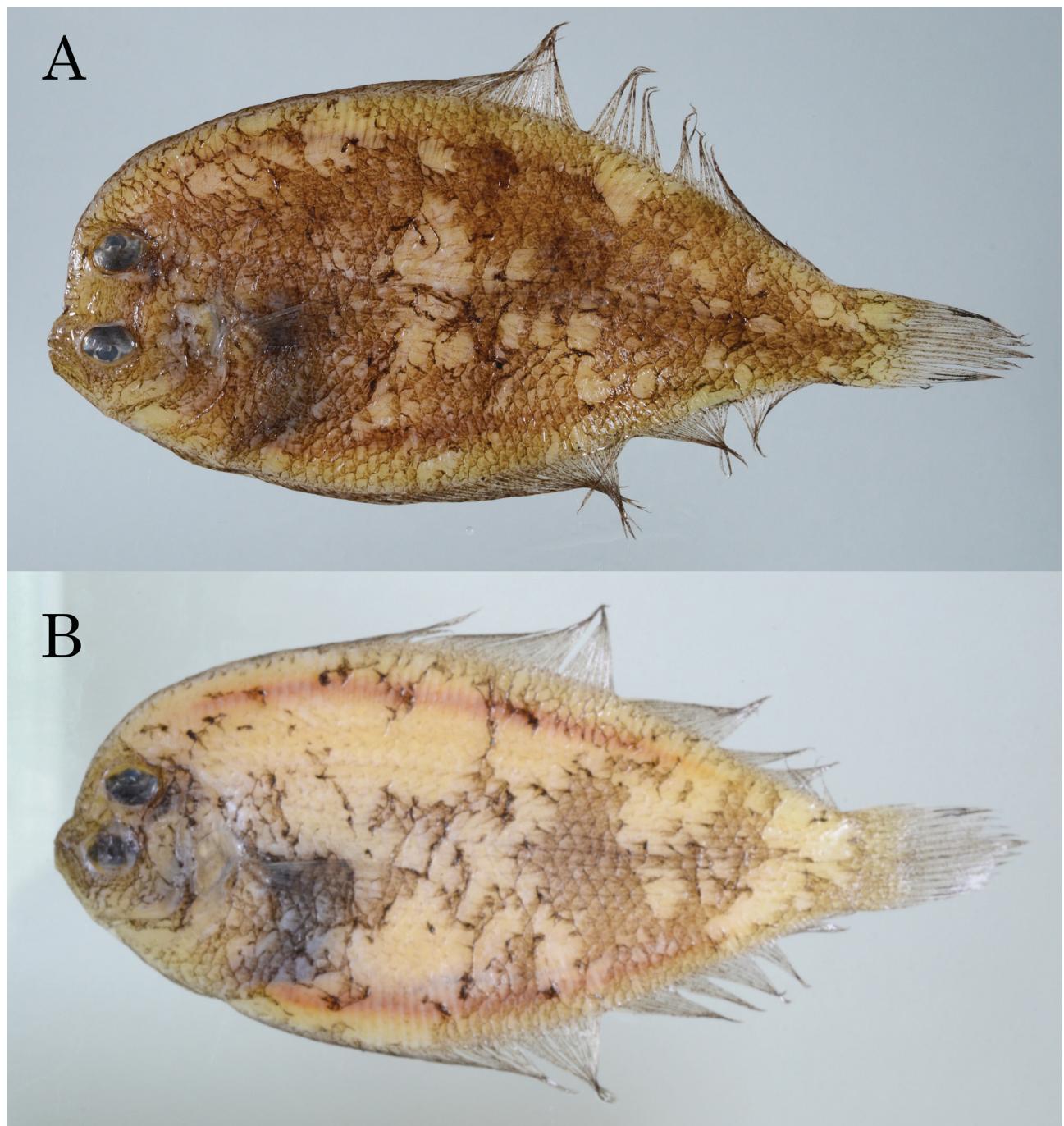


FIGURE 4. *Engyprosopon multisquamum* Amaoka, 1963. Ocular side, NMMB-P8852, male, 89.5 mm SL. B. NMMB-P14467, female, 75.3 mm SL.

Body rather narrowly ovate, deepest about at middle of body, body depth usually less than 1/2 of SL; dorsal and ventral contours of body almost symmetrical. Caudal peduncle about 1/4 of body depth. Head small, its length about 1/4 of SL; upper profile with distinct concavity anterodorsal to upper margin of lower eye, profile steep in mature males, not so in females and juveniles. Snout short, much shorter than eye diameter. Ocular-side rostral spine on snout tip in males, absent or feeble in females and juveniles. Eyes small, eye diameter distinctly less than upper jaw length; lower eye slightly in advance of upper eye. No orbital spine in either sex. Interorbital space moderately concave, distinct sexual and ontogenetic differences in its width; interorbital width greater in males than in females. Ocular-side nostrils anterior to upper margin of lower eye; anterior nostril tubular with wide flap; posterior nostril a short tube; blind-side nostrils very small and similar to those on ocular side, closely set below origin of dorsal fin.

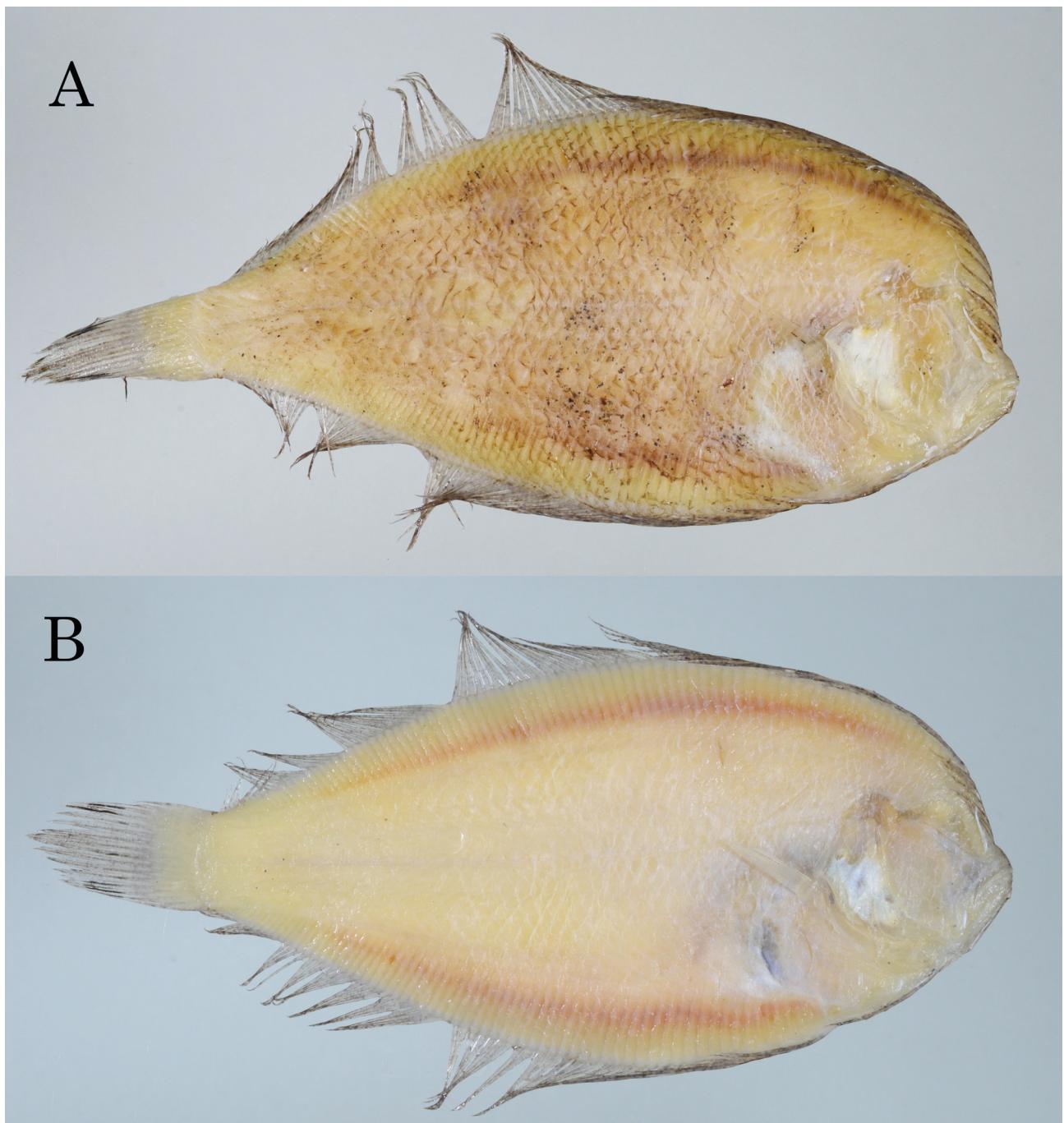


FIGURE 5. *Engyprosopon multisquamum* Amaoka, 1963. Blind side, same specimens as those in Figure 4.

Mouth small, oblique; maxilla extending ventroposteriorly slightly beyond vertical through anterior margin of lower eye; anterior tips of both jaws about on same vertical line, when mouth closed; small knob on mandibular symphysis. Teeth in upper jaw biserial, those in outer series larger and more widely spaced than those in inner series; some teeth anteriorly canine-like; lower jaw teeth uniserial, conical, almost same size as upper inner teeth. Gill rakers on first arch moderately slender, sharp at tip, inside edge not serrate; no gill rakers on upper limb. Ocular-side scales ctenoid with short ctenii, large and deciduous; tips of both jaws and tip of ocular side of snout naked; scales cycloid on blind side of body.

Dorsal and anal fins without elongate rays. Ocular-side pectoral fin with elongate filamentous rays in both sexes; rays in males longer than those in females; blind-side pectoral fin not elongate; same length in both sexes. Ocular-side pelvic-fin origin at tip of isthmus, fifth ray of ocular-side fin opposite to first ray of blind-side fin; anterior margin of first ray of ocular-side pelvic fin with skin flap. Tip of isthmus near vertical line through middle

of lower eye. Caudal-fin rays branched except for three upper- and three lowermost rays. Tip of pelvic bone not distinctly extruded.

Coloration in alcohol. Ocular side of body uniformly light yellowish green without any distinct markings; caudal fin with pair of large black blotches arranged between second to fourth fin rays from upper- and lowermost fin rays, respectively; all fins with irregularly-scattered, small black spots; blind side of body dark, except for part of head in males; blind side of body uniformly yellowish white in females.

Sexual dimorphism. This species shows sexual dimorphism in slope of the anterior margin of the head, in interorbital width, presence or absence of a rostral spine, length of the ocular-side pectoral fin, and in coloration on the blind side of the body.

Distribution. Western Pacific Ocean off Taiwan and southern Japan; also found in mouth of Mekong River, Vietnam (KA, pers. data). Commonly collected at depths less than 100 m off Taiwan.

Remarks. This species has frequently been confused with *E. grandisquama* in having a pair of black blotches on the caudal fin. However, *E. multisquama* differs from the latter in having larger black blotches on the caudal fin, a more elongate body, a more elongate ocular-side pectoral fin, greater number of scales in the lateral line, and by its higher meristic values.

Engyprosopon mogkii (Bleeker, 1854)

Figures 6–7; Table 1

Rhombus mogkii Bleeker, 1854:256 (type locality: Manado, Sulawesi, Indonesia).

Rhomboichthys (Engyprosopon) mogkii: Günther, 1862:438.

Pseudorhombus mogkii: Bleeker, 1863:230.

Platophrys (Arnoglossus) mogkii: Bleeker, 1870-75:14.

Engyprosopon mogkii: Weber, 1913:429; Norman, 1927:27; Norman, 1934:207.

Bothus (Arnoglossus) mogkii: Weber & Beaufort, 1929:129.

Material examined. ASIZP 63578, male, 91.1 mm SL, Daxi, Yilan, northeastern Taiwan, 29 Sep. 2000; NMMB-P11510, male, 63.0 mm SL, Dapong Bay, Pingtung, southwestern Taiwan, 18 Sep. 1999.

Diagnosis. No concavity on head margin anterior to lower eye (Fig. 6A); gill rakers very slender, long and not serrate (Fig. 7B); narrow interorbital width; no sexual dimorphism in coloration on blind side of body (Fig. 6B).

Description. Dorsal-fin rays 85–87, anal-fin rays 63–67, ocular-side pectoral-fin rays 11–12, blind-side pectoral-fin rays 8–9, caudal-fin rays 3 + 11 + 3, ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales in lateral line 50–51, gill rakers 0 + 6–8, vertebrae 10 + 24–25.

In SL: HL 3.75–4.05, body depth 1.82–1.89. In HL: snout 4.17–5.79, upper eye diameter 3.65–4.09, lower eye diameter 3.65–4.17, interorbital width 7.81–12.5, ocular-side upper jaw 2.74–3.01, blind-side upper jaw 2.65–2.90, ocular-side lower jaw 2.14–2.19, blind-side lower jaw 1.99–2.05, caudal peduncle depth 1.74–2.23, ocular-side pectoral fin 1.17–1.23, blind-side pectoral fin 1.76–1.93, ocular-side pelvic fin 2.18–2.81, blind-side pelvic fin 2.03–2.27, base of ocular-side pelvic fin 2.47–2.58, base of blind-side pelvic fin 7.76–8.40, longest dorsal fin ray 1.84–2.06, longest anal fin ray 1.92–1.98, middle caudal fin ray 1.07–1.24.

Body ovate, deepest slightly anterior to vertical through middle of body; body depth about 1/2 of SL; dorsal and ventral contours gently arched, anterior half of dorsal contour of body slightly steeper than contour of posterior half. Caudal peduncle moderately deep, its depth less than 1/3 of body depth. Head small, its length about 1/4 of SL; upper head profile without concavity anterior to lower eye. Snout short, shorter than eye diameter. Rudimentary rostral spine present in males (absent in females and juveniles in comparative specimens). Eyes small, both diameters less than length of maxilla; lower eye slightly in advance of upper eye. No orbital spine in either sex. Interorbital area distinctly concave (no sexual and ontogenetic differences noted). Nostrils on ocular side anterior to upper margin of lower eye; anterior nostril a short tube with a small triangular flap posteriorly; nostrils on blind side closely set below origin of dorsal fin, similar in shape to those on ocular side.

Mouth rather large, oblique; maxilla extending ventroposteriorly to slightly beyond anterior margin of lower eye; anterior tips of both jaws nearly on same vertical line when mouth closed. Small symphysial knob at ventral tip of mandible. Teeth on upper jaw biserial, those in outer series larger and more widely spaced than those in inner series; lower jaw teeth uniserial, conical, all teeth almost the same size. Gill rakers on first arch slender, with sharp

tips, inside edge smooth; no gill rakers on upper limb; borders between each gill lamella, except those on distal of lower limb and those basal to distal half of upper limb, with dark pigmentation (Fig. 7B).

Ocular-side scales small, ctenoid with short ctenii (Fig. 7A); tips of both jaws and ocular side of snout naked; scales on blind side of body cycloid. First dorsal fin ray with anterior and posterior flaps somewhat free from other rays; second to sixth dorsal-fin rays more or less elongate (based on comparative specimens). Second pectoral fin ray on ocular-side elongate in males, short in females and juveniles. Ocular-side pelvic-fin origin at tip of isthmus, ocular-side fifth pelvic-fin ray opposite to first ray of blind-side pelvic fin. Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched, except for three upper- and three lowermost rays.

Coloration in alcohol. Ocular side of body dark brown with many darker and paler spots; a series of dark spots on straight part of lateral line. Blind side of body pale yellowish-white in both sexes. All fins on ocular side fins dark brown with numerous dark spots; paired fins on blind side uniformly yellowish white.

Sexual dimorphism. This species shows sexual dimorphism only in length of the ocular-side pectoral fin and in the presence of a rostral spine on the snout.

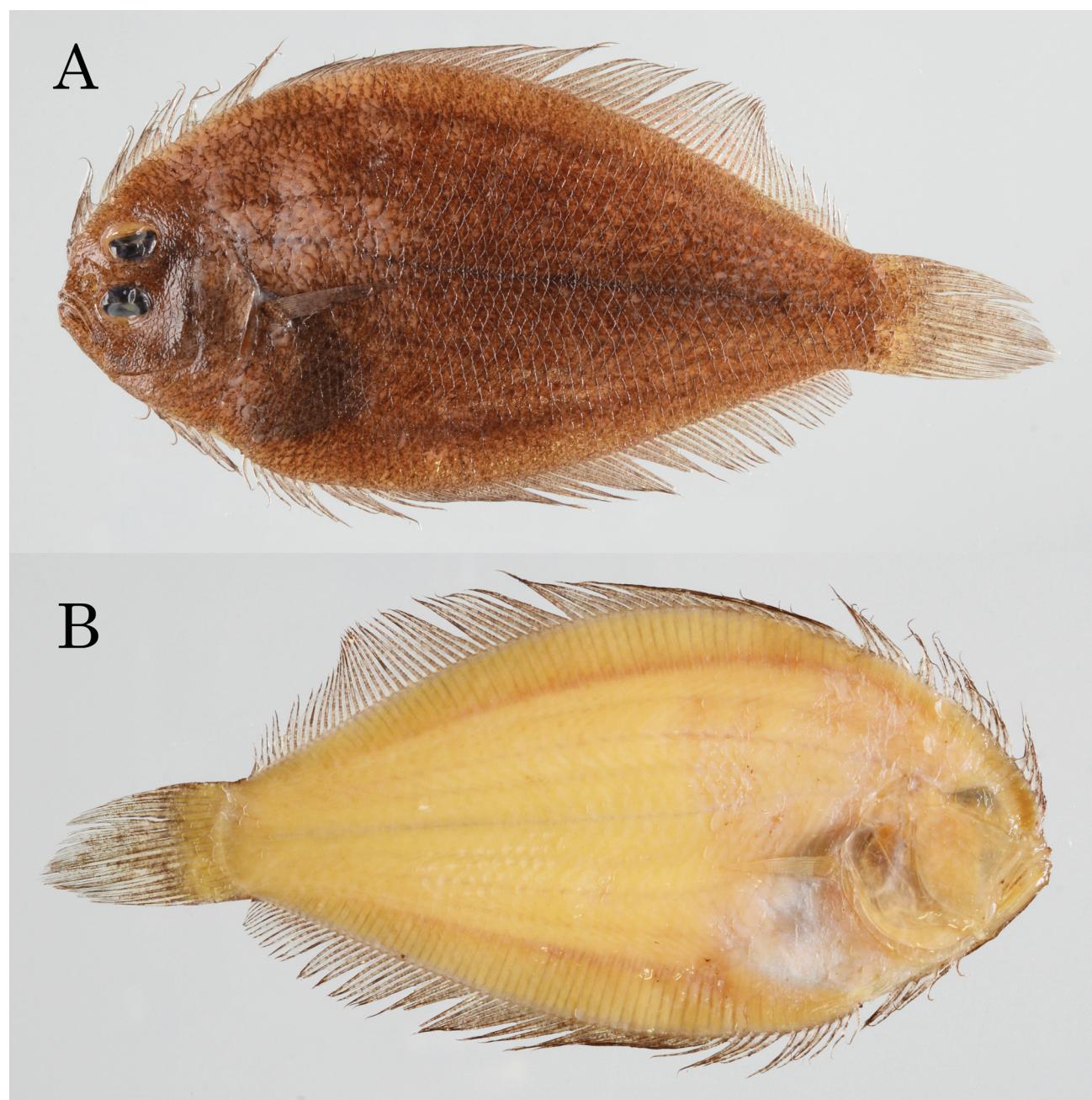


FIGURE 6. *Engyprosopon mogkii* (Bleeker, 1854). ASIZP 63578, male, 91.1 mm SL. A. ocular side, B. blind side.

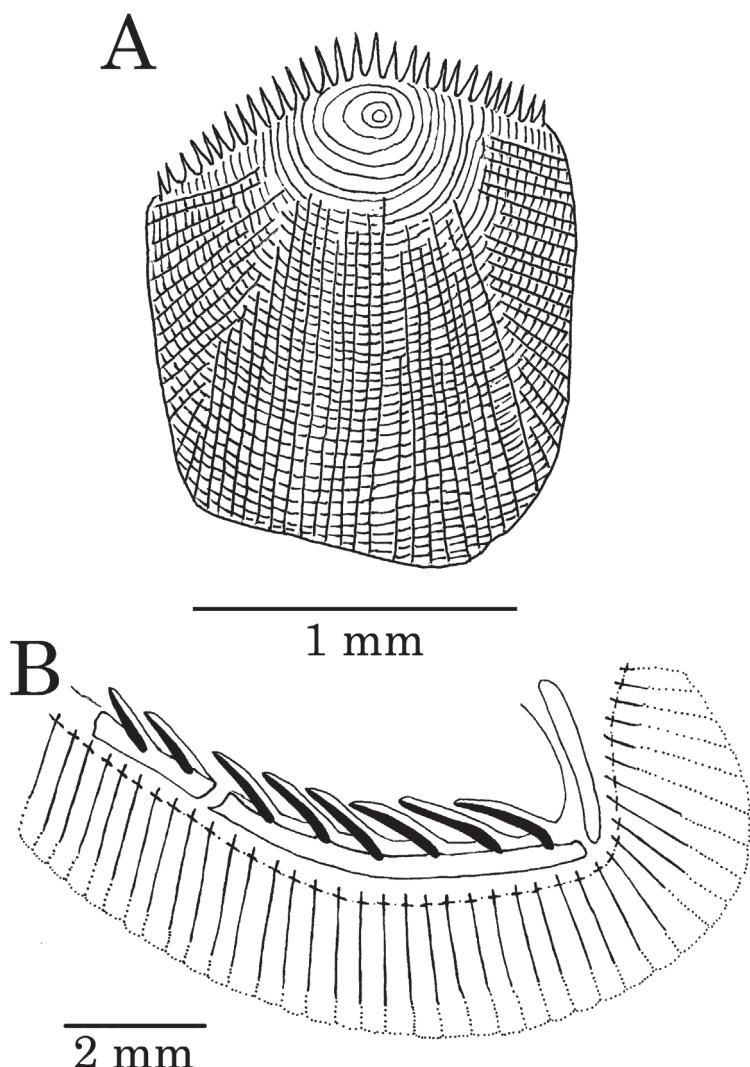


FIGURE 7. *Engyprosopon mogkii* (Bleeker, 1854). A. Scales on ocular side, B. Gill rakers on first arch, from ASIZP 63578.

Distribution. Widespread in the Indo-West Pacific Ocean: Taiwan, Malay Peninsula and Archipelago and Coral Sea, through the Indian Ocean. Bathymetric range 2–198 m (Hensley & Amaoka, 2001).

Remarks. This species clearly differs from most congeners in not having secondary sexual differences in the width of the interorbital space, in the rostral spine (obscure spine in large males), and in the coloration of the blind side of the body. This species is closely related to species of the genus *Asterorhombus* in the absence of distinct sexually dimorphic characters and by the distinct branching features in the caudal skeleton (Amaoka & Arai, 1998). Despite similarities in these features, this species belongs in *Engyprosopon*, as *Asterorhombus* is well-defined by having a lure on the first dorsal-fin ray and palmate gill rakers (Hensley, 2005). The present study is the first record of this species from off Taiwan, and is also the northernmost and easternmost records for this species.

Engyprosopon maldivense (Regan, 1908)

Figures 8–9; Table 1

Scæops maldivensis Regan, 1908:234, pl. 25, fig. 1 (type locality: Maldives, Indian Ocean, depth 27–44 fathoms [49.3–80.5 m]).

Engyprosopon maldivensis: Norman, 1934:216, fig. 165; Amaoka *et al.*, 1993:393, fig. 8; Hensley & Amaoka, 2001:3832; Shao *et al.*, 2008:264; Shen & Wu, 2012:751, 1 fig.

Arnoglossus maculipinnis Fowler, 1934: 329, fig. 84 (type locality: Vicinity of Jolo, Sulu Province, Philippines, $6^{\circ}08'45''$ N, $121^{\circ}03'$ E, depth 20–76 fathoms [36.6–139 m]).
Engyprosopon borneensis Chabanaud, 1948:64, fig. 1 (type locality: Northeast of Datae [Datae] Point, north coast of Borneo).
Engyprosopon macroptera Amaoka, 1963:115, fig. 5 (type locality: Mimase, Kochi Prefecture, Japan). Amaoka, 1969:154, fig. 52; Shao *et al.*, 2008:264; Ho *et al.*, 2009:10; Shen & Wu, 2012:751, 1 fig.
Engyprosopon filimanus (not of Regan, 1908): Chen & Weng, 1965:49, fig. 33.

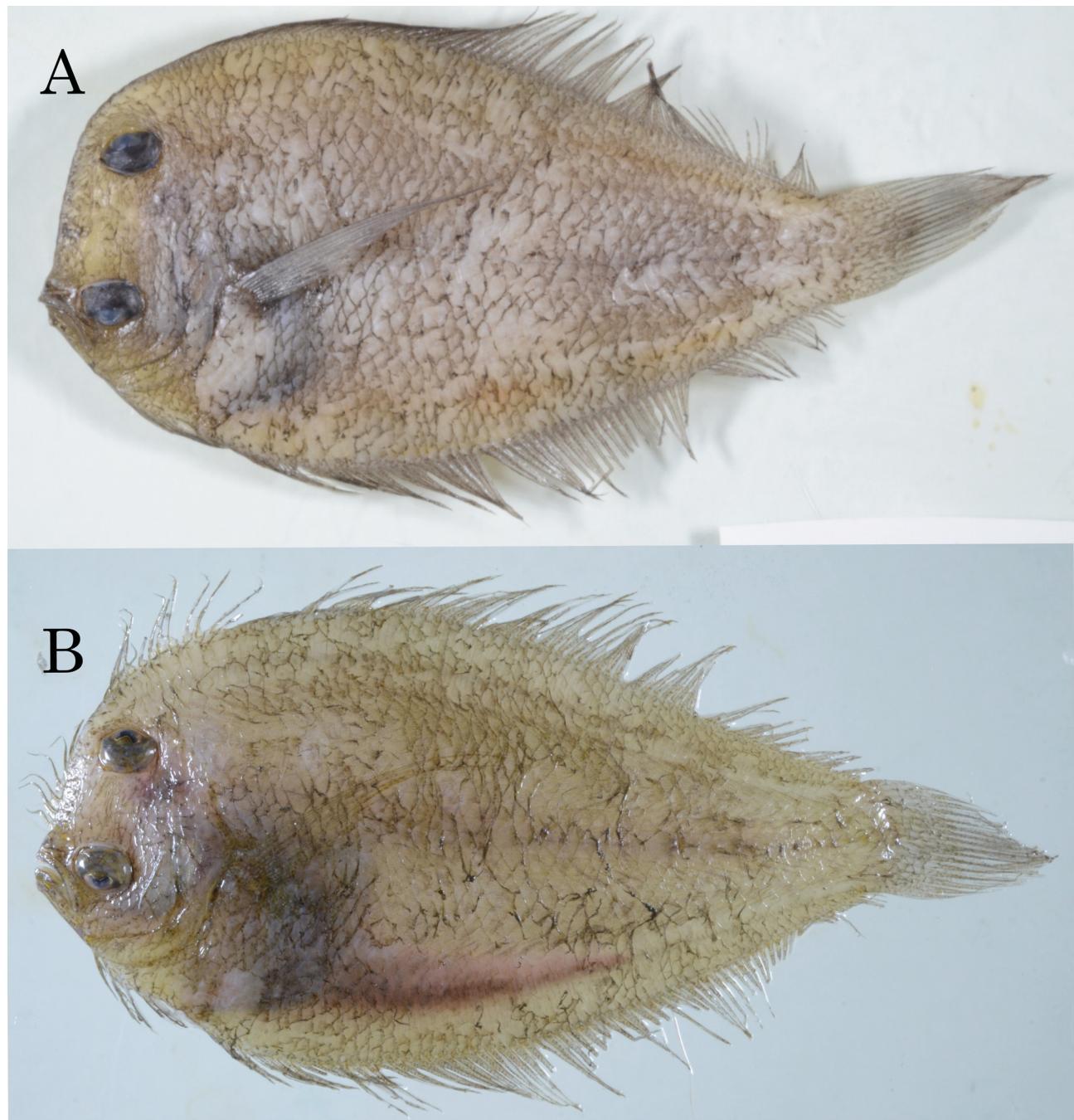


FIGURE 8. *Engyprosopon maldivense* (Regan, 1908). Ocular side, A. NMMB-P22226, male, 121.3 mm SL. B. NMMB-P22238, female, 102.3 mm SL.

Material examined. NMMB-P2053, male, 113.5 mm SL, date unknown; NMMB-P2771, male and 2 females, 76.1–83.0 mm SL, Chie-din, 50 m, 1 Nov. 2001; NMMB-P6695, male, 180.5 mm SL, 11 Oct. 1965; NMMB-P22226, 3 males, 112.7–151.6 mm SL, Ke-tzu-liao, 11 Feb. 2015; NMMB-P22238, 4 females, 83.2–102.7 mm SL, Ke-tzu-liao, 12 Mar. 2015; NMMB-P22254, sex unknown, 71.1 mm SL, Ke-tzu-liao, 21 Jan. 2015; all collected from Kaohsiung, southwestern Taiwan.

Diagnosis. Caudal fin without black blotches; ocular-side pectoral fin with greatly elongate filament in both sexes; gill rakers not serrate; upper jaw teeth biserial.

Description. Dorsal-fin rays 85–94, anal-fin rays 64–69, ocular-side pectoral-fin rays 10–12, blind-side pectoral-fin rays 9–11, caudal-fin rays 3 + 11 + 3; ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales in lateral line 44–48, gill rakers 0–3 + 8–11, vertebrae 10 + 25–26.

In SL: HL 3.68–4.42, body depth 1.82–2.10. In HL: snout 3.78–5.20, upper eye diameter 3.12–3.96, lower eye diameter 3.09–4.16, interorbital width 1.65–2.31 in males, 2.72–3.89 in females, ocular-side upper jaw 2.59–2.77, blind-side upper jaw 2.56–2.78, ocular-side lower jaw 1.95–2.18, blind-side lower jaw 1.99–2.18, caudal peduncle depth 1.74–2.13, ocular-side pectoral fin 0.43–0.61, blind-side pectoral fin 1.56–2.00, ocular-side pelvic fin 1.73–2.33, blind-side pelvic fin 1.85–2.72, base of ocular-side pelvic fin 2.05–2.42, base of blind-side pelvic fin 5.52–7.25, longest dorsal fin ray 1.55–1.98, longest anal fin ray 1.44–2.00, middle caudal fin ray 0.86–1.12.

Body moderately ovate, deepest slightly anterior to vertical through middle of body; body depth usually more than 1/2 of SL; dorsal and ventral contours of body nearly symmetrical with gradual taper posteriorly. Caudal peduncle subequal to, or less than, 1/4 of body depth. Head small, its length about 1/4 of SL; upper profile of head with small concavity slightly anterodorsal to upper margin of lower eye, very steep, almost vertical in mature males, not so in females and juveniles. Snout rather long, slightly protruding, shorter than eye diameter. Rostral spine present on both sides of snout in males; ocular-side spine stronger than that on blind side; rostral spine absent or feeble in females and juveniles. Eyes large, eye diameter shorter than upper jaw length, lower eye in advance of upper eye. No orbital spine in either sex. Interorbital space widely concave, distinct sexual and ontogenetic differences in width, interorbital width wider in males than in females. Ocular-side nostrils anterior to upper margin of lower eye; anterior nostril a longer tube than that of posterior nostril; blind-side nostrils closely set below origin of dorsal fin, very small.

Mouth rather large, oblique; maxilla extending to vertical through anterior 1/3 of lower eye; anterior tip of upper jaw distinctly beyond tip of lower jaw, when mouth closed; small knob at mandibular symphysis. Teeth on upper jaw biserial, those in outer series larger, more widely spaced and sparse compared with those in inner series, some canine-like teeth anteriorly, protruded before tip of lower jaw; lower jaw teeth uniserial, conical, nearly same size as anterior teeth of upper inner series. Gill rakers on first arch slender; inside edge not serrate, but covered by skin with tiny hairs; no or few rudimentary gill rakers on upper limb. Ocular-side scales ctenoid with short ctenii, large and deciduous; tips of both jaws and of ocular side of snout naked; scales cycloid on blind side of body.

Dorsal and anal fins without elongate rays. Ocular-side pectoral fin with elongate filamentous rays in both sexes; elongate ray about 1.2–2.3 times of head length; blind-side pectoral-fin rays not elongate. Ocular-side pelvic-fin origin at tip of isthmus, ocular-side fifth ray opposite to blind-side first ray. Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched, except for three upper- and three lowermost rays. Tip of pelvic bone not distinctly extruded.

Coloration in alcohol. Ocular side of body pale yellowish green; anterior margin of head anterior to both eyes with tiny black dots; one distinct black spot at middle of anterior margin of upper eye; sometimes with a black spot at posterior upper corner of lower eye, and one black spot at anterior and posterior parts, respectively. Blind side of body in males dark grey, except for pale yellowish white head; blind side of body of females uniformly yellowish white. All fins on ocular side uniformly semi-transparent, without special markings.

Sexual dimorphism. This species shows sexual dimorphism only in interorbital width, presence of a rostral spine, and coloration on the blind side of the body.

Distribution. Widespread in the Indo-West Pacific Ocean: southern Japan, Taiwan, South China Sea, Philippines, northwestern Australia, Coral Sea, and Maldives Islands. Bathymetric range 30–215 m, usually 30–75 m (Amaoka *et al.*, 1993). In Taiwan, it is commonly collected from depths less than 100 m.

Remarks. This species, characterized in lacking black blotches on its caudal fin and in having an elongate pectoral fin on the ocular side in both sexes, was previously reported from waters off Taiwan as *E. macroptera*. Amaoka *et al.* (1993) synonymized this species with *E. maldivense*, previously known from the Maldives Islands, notwithstanding that *E. maldivense* has a wide range of meristic features with its geographic distribution.

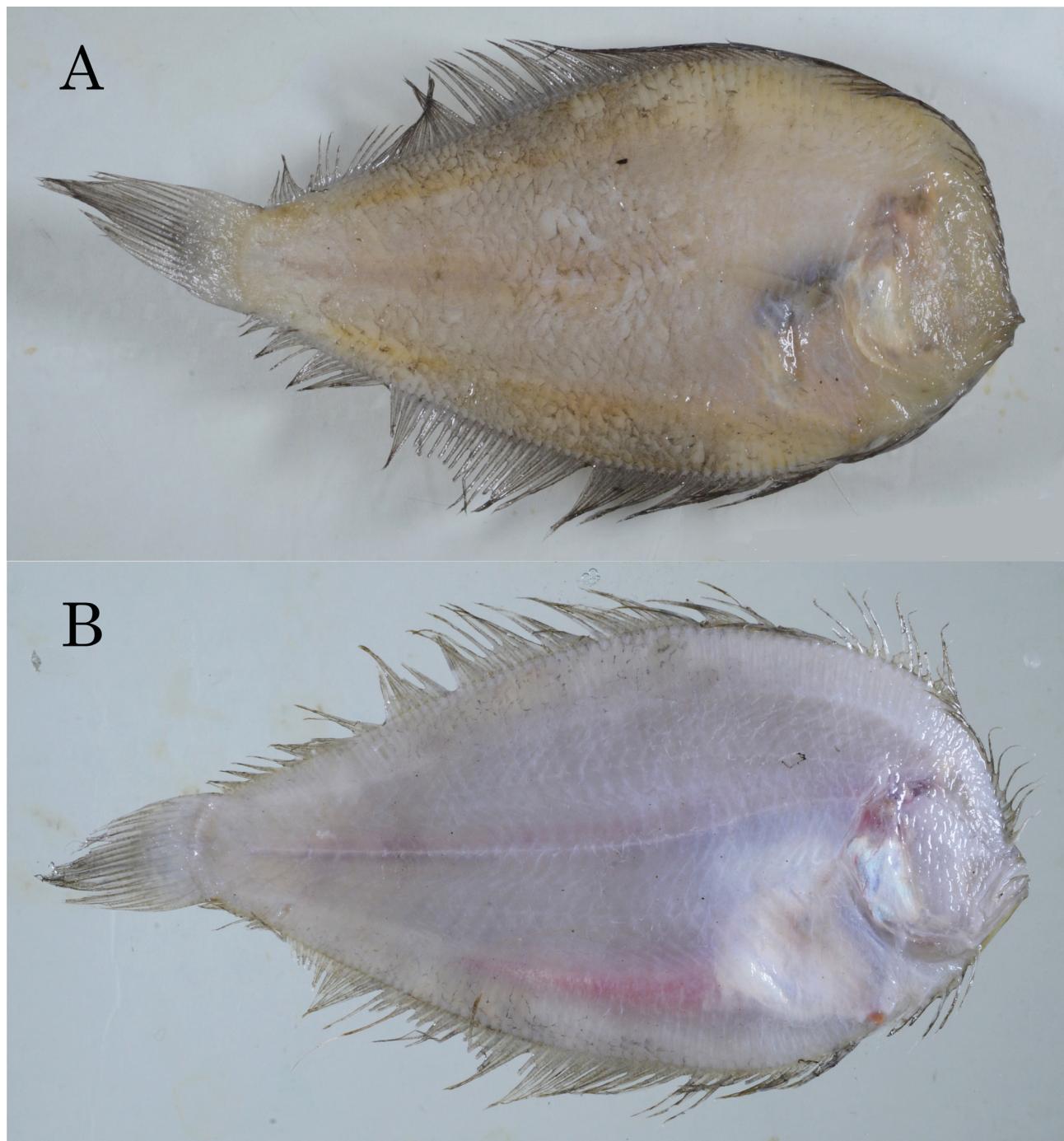


FIGURE 9. *Engyprosopon maldivense* (Regan, 1908). Blind side, same specimens as those in Figure 8.

TABLE 1. Morphometric data (% of SL) of five *Engyprosopon* species in Taiwan. M = male(s); F = female(s); O = ocular side; B = blind side.

| Taxon | <i>E. xystrias</i> | <i>E. grandisquama</i> | <i>E. multisquama</i> | <i>E. mogkii</i> | <i>E. maldivense</i> |
|--------------|--------------------|-----------------------------------|-----------------------------------|------------------|-------------------------------------|
| SL (mm) (n) | 88.7 (1M) | 67.5–82.5 (6M), 65.7–72.6 (4F) | 82.0–97.0 (7M), 73.1–91.7 (4F) | 63–91.1 (2M) | 91.8–180.5 (6M), 71.1–102.7 (7F) |
| Head length | 26.3 | 24.1–27.4 | 22.9–26.1 | 24.7–26.7 | 22.6–27.1 |
| Body depth | 49.2 | 53.7–61.3 | 49.3–53.5 | 52.9–55.1 | 47.6–54.9 |
| Snout Length | 5.6 | 4.7–5.6 | 4.6–5.1 | 4.6–5.9 | 5.2–6.3 |

...Continued on next page

TABLE 1. (Continued)

| Taxon | <i>E. xystrias</i> | <i>E. grandisquama</i> | <i>E. multisquama</i> | <i>E. mogkii</i> | <i>E. maldivense</i> |
|-------------------------|--------------------|-----------------------------|----------------------------------|------------------|------------------------------|
| Upper-eye diameter | 8.9 | 7.9–9.3 | 6.1–7.9 | 6.0–7.3 | 5.7–8.6 |
| Lower-eye diameter | 9.0 | 7.7–8.9 | 6.1–7.8 | 5.9–7.3 | 5.4–8.6 |
| Interorbital width | 9.9 | 7.7–8.9 (M), 4.9–5.8 (F) | 4.1–6.6 (M), 2.8–3.5 (F) | 2.0–3.4 | 8.1–13.8 (M), 6.5–8.7 (F) |
| Upper-jaw length (O) | 8.9 | 7.2–8.3 | 7.3–8.7 | 8.0–8.9 | 7.1–9.8 |
| Upper-jaw length (B) | 9.0 | 7.1–8.2 | 7.5–9.0 | 9.2–9.3 | 6.8–9.9 |
| Lower-jaw length (O) | 10.8 | 10.5–11.7 | 9.8–12.0 | 11.5–12.2 | 9.2–12.4 |
| Lower-jaw length (B) | 11.3 | 10.8–12.5 | 11.0–13.1 | 12.4–13.0 | 10.6–13.4 |
| Caudal-peduncle depth | 109 | 12.1–13.9 | 11.6–13.1 | 12.0–114.2 | 11.8–13.1 |
| Pectoral-fin length (O) | 22.2 | 22.4–24.9 | 33.6–50.3 (M), 22.0– 26.0 (F) | 20.1–22.7 | 40.0–55.6 |
| Pectoral-fin length (B) | 10.8 | 12.1–14.1 | 12.5–14.3 | 13.8–14.1 | 12.1–15.4 |
| Pelvic-fin length (O) | 8.6 | 9.9–12.6 | 10.3–13.7 | 8.8–12.2 | 8.3–18.5 |
| Pelvic-fin length (B) | 8.2 | 10.3–12.2 | 8.2–12.1 | 11.7–12.2 | 7.1–20.4 |
| Pelvic-fin base (O) | 7.4 | 9.4–11.3 | 9.0–11.4 | 10.0–10.3 | 8.01–17.5 |
| Pelvic-fin base (B) | 3.2 | 3.0–4.4 | 3.3–4.6 | 3.2 | 3.0–6.4 |
| Longest dorsal-fin ray | — | 12.1–15.4 | 10.7–14.5 | 12.0–14.5 | 11.1–21.1 |
| Longest anal-fin ray | — | 12.1–14.2 | 12.9–14.4 | 12.8–13.5 | 11.0–28.4 |
| Middle caudal-fin ray | — | 19.6–23.7 | 20.9–26.0 | 21.6–23.2 | 19.0–31.9 |

***Engyprosopon brevifrontale* sp. nov.**

Figures 10–11; Table 2

Holotype. NMMB-P22217, male, 93.5 mm SL, Ke-tzu-liao, Kaohsing, southwestern Taiwan, northern South China Sea, bottom motor trawl, ca. 30–100 m, 28 Mar. 2015.

Paratype. NMMB-P25746, male, 85.8 mm SL, collected with holotype.

Diagnosis. A species of *Engyprosopon* with a deep and short body, large eyes situated close to the margin of the head, 0 + 9–10 smooth gill rakers, strong rostral spine on the ocular side, strong upper orbital spines, small rostral spine on the blind side, and with a dark blue peritoneum.

Description. Dorsal-fin rays 83 (85 in paratype), anal-fin rays 64 (67), ocular-side pectoral-fin rays 12 (12), blind-side pectoral-fin rays 9 (9), ocular-side pelvic-fin rays 6 (6), blind-side pelvic-fin rays 6 (6), scales in lateral line 43 (43), gill rakers 0 + 10 (0 + 9), vertebrae 10 + 25 (10 + 25).

In SL: HL 3.77 (3.65), body depth 1.73 (1.67). In HL: snout 4.77 (5.34), upper eye diameter 2.88 (2.73), lower eye diameter 2.82 (3.09), interorbital width 3.18 (2.87) in males, ocular-side upper jaw 2.56 (2.67), blind-side upper jaw 2.58 (2.28), ocular-side lower jaw 2.14 (2.10), blind-side lower jaw 1.92 (2.10), caudal peduncle depth 2.25 (2.24), ocular-side pectoral fin 0.64 (0.48), blind-side pectoral fin 1.77 (1.62), ocular-side pelvic fin damaged, blind-side pelvic fin damaged, base of ocular-side pelvic fin 2.46 (2.45), base of blind-side pelvic fin 8.27 (8.39), longest dorsal fin ray damaged, longest anal fin ray damaged, middle caudal fin ray damaged.

Body deeply ovate, deepest in anterior 1/3 of body, its depth much deeper than 1/2 of SL; dorsal and ventral contours similar, except for head region anterior to eyes. Caudal peduncle about equal to 1/5 of body depth. Head large, its length slightly longer than 1/4 of SL; upper profile steep with a concavity anterior to upper margin of lower eye. Snout very short, much shorter than eye diameter. Strong rostral spine, orientated upward, at snout tip on both sides in males, blind-side spine much shorter than ocular-side spine (Fig. 11A, B). Eyes large, eye diameter slightly shorter than maxilla length, lower eye slightly in advance of upper eye. Strong orbital spine orientated upward, before upper eye, bifurcated at tip (Fig. 11A). Interorbital space wide, deeply concave. Ocular-side nostrils dorsal to rostral spine and anterior to upper margin of lower eye; anterior nostril a short tube with tiny flap

anteriorly and large round flap posteriorly, posterior nostril a short tube; blind-side nostrils very small, closely set below origin of dorsal fin.

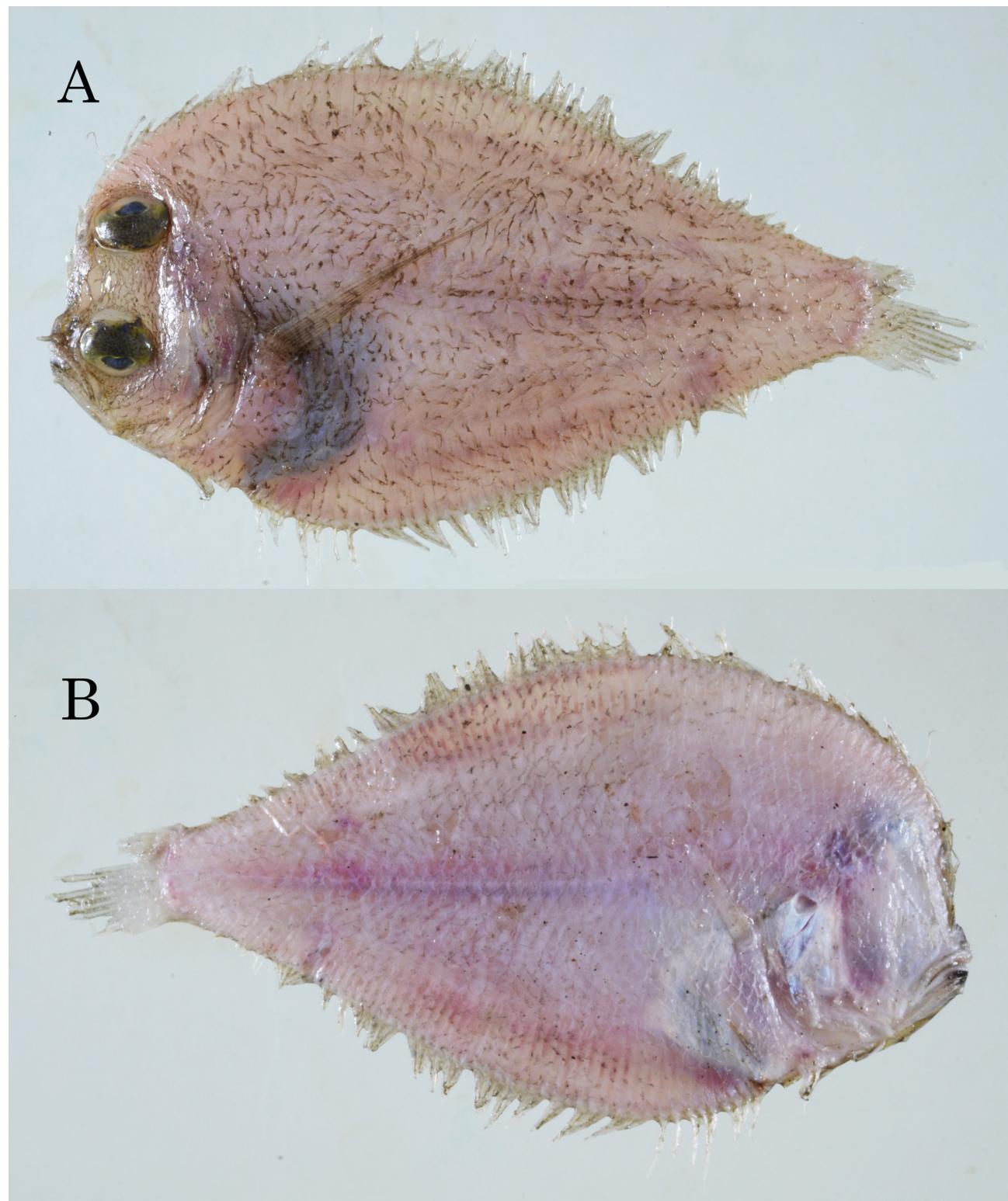


FIGURE 10. *Engyprosopon brevifrontale* sp. nov. NMMB-P22217, holotype, male, 93.5 mm SL. A. ocular side, B. blind side.

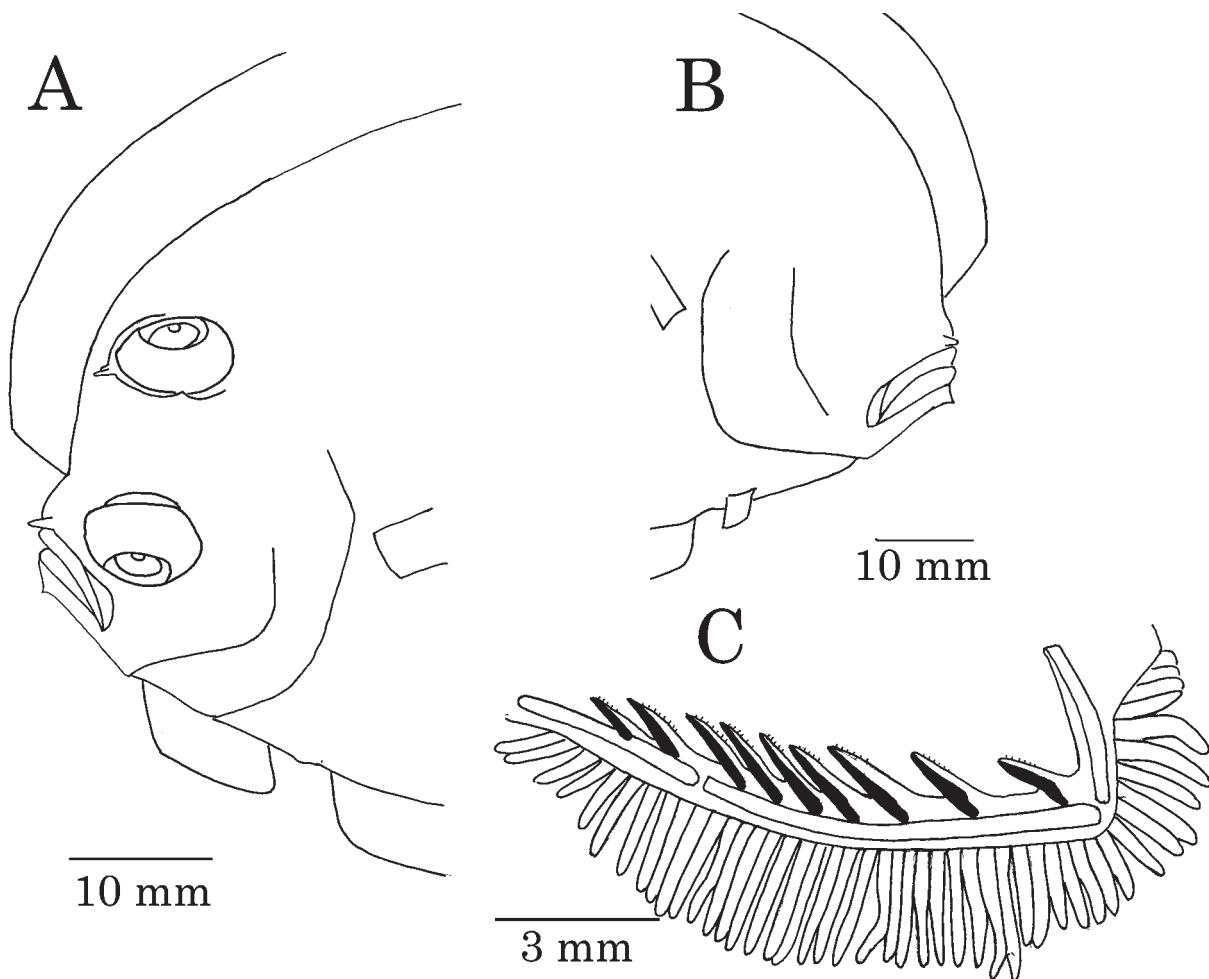


FIGURE 11. *Engyprosopon brevifrontale* sp. nov. A. Rostral and orbital spines on ocular side, B. rostral spine on blind side, C. gill rakers on first arch, from NMMB-P25746, paratype.

Mouth large, oblique; maxilla extending to vertical through middle of lower eye; anterior tip of upper jaw beyond tip of lower jaw when mouth closed. Teeth on ocular-side upper jaw biserial, those in outer series larger, more widely spaced and fewer than those in inner series; some canine-like teeth anteriorly; series of inner teeth small, conical, close-set, angled inwards; teeth on blind-side upper jaw almost uniserial; lower jaw teeth uniserial, conical, similar in size to anterior teeth in upper outer series; anterior teeth of upper jaw protruding outside beyond tip of lower jaw when mouth closed. Gill rakers on first arch long, slender, with smooth edges; no gill rakers on upper limb (Fig. 11C). Scales on both sides very deciduous; those on ocular side of body feebly ctenoid with short ctenii; tips of both jaws and snout naked; scales on blind side of body cycloid.

Dorsal-fin origin on blind side below concavity on head margin, without elongate rays. Anal-fin origin ventral to pectoral fin base. Ocular-side pectoral fin with elongate rays, second fin ray longest, 1.6 (2.1 in paratype) times of head length; length of blind-side pectoral fin much less than one-half of ocular-side fin. Ocular-side pelvic-fin origin at tip of isthmus, ocular-side fifth ray opposite to first ray of blind-side fin. Tip of isthmus near vertical line through middle of lower eye. Distal part of caudal-fin rays broken, middle rays branched.

Coloration in alcohol. Ocular side of body light brown with many scale pockets with dark skin; dark blue on peritoneum region; inner sides of surface of both eyes with numerous dark spots; tip of lower jaw with dark spots. On blind side, body dark except for head; tip of lower jaw black.

Sexual dimorphism. No female specimens were available to this study; however, based on other species of this genus with similar features, it is probable that this species likely to be sexually dimorphism in interorbital width, the presence of rostral and orbital spines, length of the ocular-side pectoral fin and in coloration on the blind side of the body.

Distribution. Known from only the type specimens collected from off Ke-tzu-liao, Kaohsiung, southwestern Taiwan at depth around 30–100 m.

Remarks. This species resembles two congeners, *E. xenandrus* from Hawaii and *E. vanuatuense* from Vanuatu, in having a deep body and large eyes. The new species differs from these others in having a deeper body (1.67–1.73 vs. 1.83–2.04 in SL), smaller head (3.65–3.77 vs. 3.09–3.49 in SL), fewer gill rakers (0 + 9–10 vs. 0–3 + 13–14) and in other counts and proportions (Table 3). It also resembles *E. filimanus* and *E. maldivense* in lacking a pair of black blotches on the caudal fin, in having similar numbers of dorsal- and anal- fin rays, scales in lateral line and several other features, but differs from both in its deeper body (1.67–1.73 vs. 1.82–2.10), larger upper eye (2.73–2.88 vs. 3.12–3.96), narrower caudal peduncle (2.24–2.25 vs. 1.74–2.15) and other differences as shown in Table 3.

Engyprosopon longipelvis Amaoka, 1969

Figure 12, Table 2

Engyprosopon longipelvis Amaoka, 1969: 93 (type locality: Mimase, Kochi Prefecture, Japan).

Material examined: NMNM-P26187, 3 males, 46.0–58.1 mm SL, Ke-tzu-liao, Kaohsiung, southwestern Taiwan, 5 Apr. 2017.

Diagnosis. Gill rakers slender with spines; 37–40 scales in lateral line; ocular-side pelvic-fin rays in males elongate, and its fin membrane with many black spots.

Description. Dorsal-fin rays 78–82, anal-fin rays 59–60, ocular-side pectoral-fin rays 11–12, blind-side pectoral-fin rays 9–10, caudal-fin rays 3 + 11–12 + 2–3, ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales in lateral line 37–40, gill rakers 0 + 7, vertebrae 10 + 24.

In SL: HL 3.62–3.90, body depth 1.93–2.11. In HL: snout 4.03–4.55, upper eye diameter 3.34–3.71, lower eye diameter 3.53–4.70, interorbital width 3.63–5.08 in males, ocular-side upper jaw 2.52–2.70, blind-side upper jaw 2.57–2.65, ocular-side lower jaw 1.88–2.04, blind-side lower jaw 1.86–1.95, caudal peduncle depth 2.23–2.35, ocular-side pectoral fin 1.41–1.51 in males, blind-side pectoral fin 2.13–2.43, ocular-side pelvic fin 1.66–1.82, blind-side pelvic fin 2.07–2.66, base of ocular-side pelvic fin 2.26–3.20, base of blind-side pelvic fin 6.05–6.21, longest dorsal fin ray 1.84–2.20, longest anal fin ray 1.88–2.05, middle caudal fin ray 1.26–1.27.

Body elliptical, deepest at middle of body, its depth about 1/2 of SL; dorsal and ventral contours similar, except head region with gradual posterior taper. Caudal peduncle less than 1/4 of body depth. Head rather large, its length more than 1/4 of SL, upper profile somewhat arched with shallow notch anterior to interorbital area; steep in mature males (not so in females and juveniles in comparative specimens). Snout obtuse, much shorter than eye diameter. A short, obtuse rostral spine on snout in males (spine absent in females). Eyes large; eye diameter much less than upper jaw length; lower eye slightly in advance of upper eye. Interorbital region wide, concave, becoming wider with growth (wider in males than in females and juveniles).

Mouth large, oblique, maxilla extending to vertical through anterior 1/2 of lower eye; anterior tips of both jaws almost on same line when mouth closed. Teeth on upper jaw biserial, those in outer series larger, more widely spaced and sparse compared with those in inner series, and enlarged anteriorly; lower jaw teeth uniserial, conical, all almost same size, and close-set. Gill rakers on first arch slender, distal part of inner margin with some small teeth; no gill rakers on upper limb. Ocular-side scales large, ctenoid with short ctenii, very deciduous; snout and both jaws naked; cycloid scales on blind side.

Dorsal-fin origin on blind side ventral to concavity on dorsal margin, no elongate rays. Anal fin origin below pectoral fin base. Ocular-side pectoral fin very short, much shorter than head length. Ocular-side pelvic-fin origin at tip of isthmus; ocular-side fourth or fifth ray opposite to first ray of blind-side fin; ocular-side pelvic-fin rays elongate in males (longest one much longer than ocular-side pectoral fin in mature males). Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched, expect for three upper- and two or three lowermost rays.

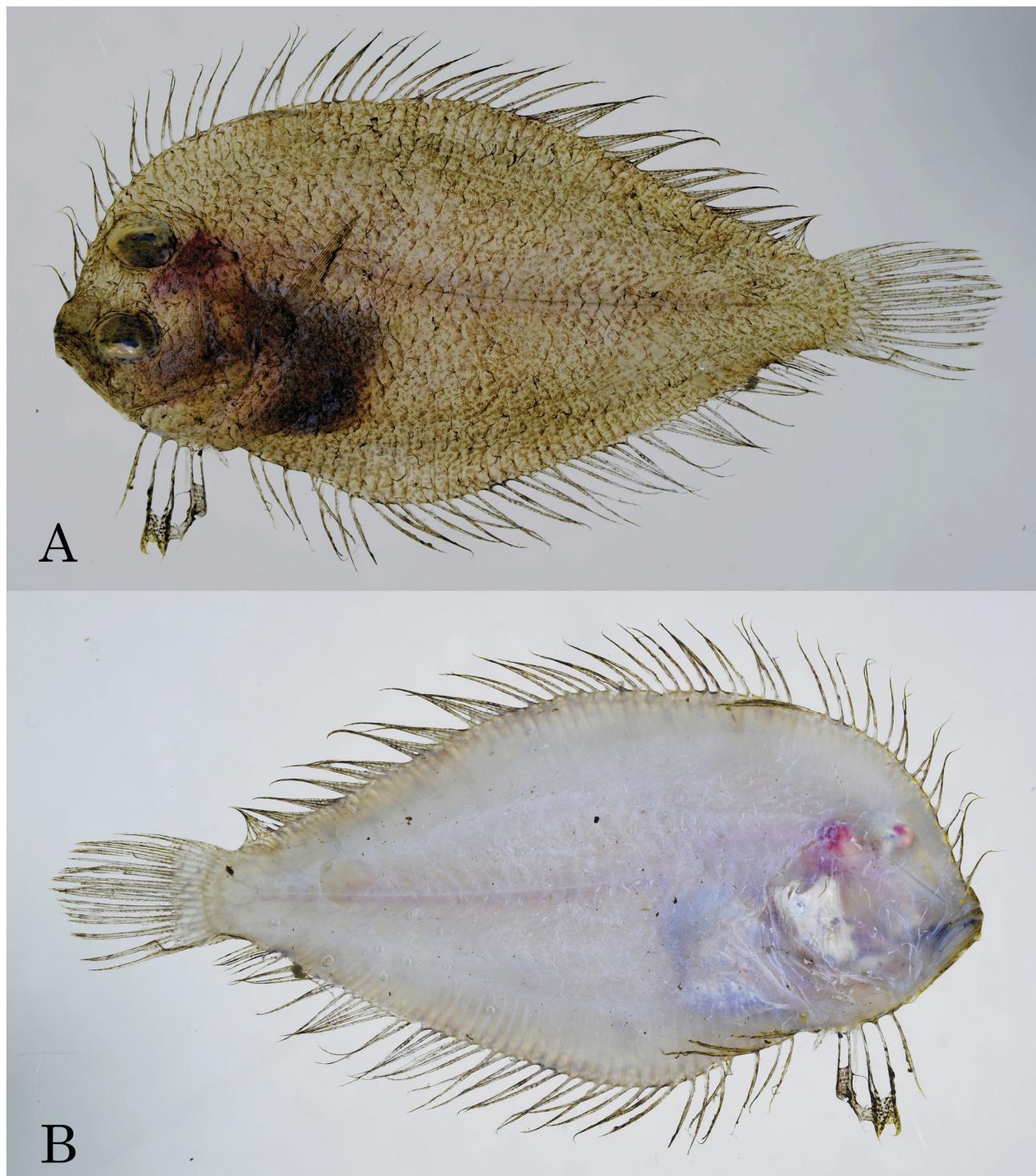


FIGURE 12. *Engyprosopon longipelvis* Amaoka, 1969. NMMB-P26187, male, 52.5 mm SL. A. ocular side, B. blind side.

Coloration in alcohol. Ground color on ocular side uniformly light brown, without distinct dark spots; blind side of body more or less dark in males (uniformly yellowish white in females). Dorsal and anal fins with irregularly scattered dark spots; pectoral and caudal fins without distinctly dark blotches or spots; ocular-side pelvic-fin membrane with many distinct black spots in males.

Sexual dimorphism. This species shows sexual dimorphism in presence or absence of the rostral spine, interorbital width, curve of anterior dorsal profile of head, length and coloration of ocular-side pelvic fin, and in coloration of the blind side of the body.

Distribution. Western Pacific Ocean off Taiwan and southern Japan. Bathymetric range about 30–100 m.

Remarks. *Engyprosopon longipelvis* is closely related to *E. mozambiquense* and *E. parvipectoralis* in having serrate gill rakers, and is easily separated from them in having 37–42 scales in the lateral line (46–52 in the latter species), by its wider interorbital width (Table 2), elongate pelvic-fin rays on the ocular side in males, ocular-side pelvic-fin membrane with many black spots, and by the uniformly dark brown caudal fin.

This is the first record of *E. longipelvis* from the waters off Taiwan, and also from beyond the waters off Japan.

TABLE 2. Morphometric data (% of SL) of four *Engyprosopon* species in Taiwan. M = male(s); F = female(s); O = ocular side; B = blind side.

| Taxon | <i>E. brevifrontale</i> sp. nov. | <i>E. longipelvic</i> | <i>E. mozambiquense</i> | <i>E. parvipectoralis</i> sp. nov. |
|-------------------------|----------------------------------|-----------------------|------------------------------------|------------------------------------|
| SL (mm) (n) | 104.3–106.4 (2M) | 46.0–58.1 (3M) | 49.8–67.0 (11M), 47.3–48.1 (3F) | 67.8 (1M), 61.9–64.6 (2F) |
| Head length | 26.5–27.4 | 25.6–27.6 | 26.1–29.0 | 29.1–29.9 |
| Body depth | 57.6–59.8 | 47.3–51.8 | 45.7–52.1 | 49.7–52 |
| Snout Length | 5.1–5.6 | 5.9–6.5 | 5.9–6.9 | 6.6–7.4 |
| Upper-eye diameter | 9.2–10.0 | 7.2–8.3 | 7.9–9.5 | 6.9–7.9 |
| Lower-eye diameter | 8.9–9.4 | 5.9–7.6 | 7.5–9.6 | 7.1–7.3 |
| Interorbital width | 8.3–9.6 | 5.4–7.1 | 1.9–3.7 (M), 1.0–1.1 (F) | 0.6–0.9 |
| Upper-jaw length (O) | 10.3–10.4 | 10.2–10.7 | 11.2–13.1 | 13.2–14.4 |
| Upper-jaw length (B) | 10.3–12.0 | 10.0–10.4 | 11.5–13.3 | 13.8–14.7 |
| Lower-jaw length (O) | 12.4–13.1 | 12.6–14.3 | 14.4–16.4 | 17.3–18.3 |
| Lower-jaw length (B) | 13.1–13.8 | 13.8–14.3 | 14.8–16.5 | 17.6–18.7 |
| Caudal-peduncle depth | 11.8–12.2 | 11.4–12.4 | 10.5–12.8 | 11.9–13.0 |
| Pectoral-fin length (O) | 41.2–57.6 | 17.0–19.6 | 32.3–46.4 (M), 20.6– 23.5 (F) | 18.3–19.7 |
| Pectoral-fin length (B) | 15.0–16.9 | 11.0–12.0 | 13.3–15.3 | 11.9–14.1 |
| Pelvic-fin length (O) | – | 14.1–16.2 | 9.6–14.6 | 10.8–12.8 |
| Pelvic-fin length (B) | – | 9.6–13.0 | 9.8–14.2 | 10.5–12.5 |
| Pelvic-fin base (O) | 10.8–11.2 | 8.4–11.4 | 9.5–12.4 | 11.1–11.5 |
| Pelvic-fin base (B) | 3.2–3.3 | 4.1–4.6 | 3.1–4.9 | 3.5–3.9 |
| Longest dorsal-fin ray | – | 11.7–15.0 | 12.6–16.4 | 13.3–13.9 |
| Longest anal-fin ray | – | 13.4–14.3 | 12.8–14.6 | 13.2–15.0 |
| Middle caudal-fin ray | – | 20.3–21.1 | 20.6–24.5 | 20.4–22.4 |

Engyprosopon mozambiquense Hensley, 2003

Figures 13–15, 19; Table 2, 4

Arnoglossus annulatus (not of Weber, 1913): Norman, 1927: 19.

Engyprosopon cocosensis (not of Bleeker, 1855): Norman, 1927: 24; Norman, 1934: 204, fig. 151; Hensley & Amaoka, 2001: 3830.

Bothus (Arnoglossus) cocosensis: Weber & de Beaufort, 1929: 428.

Engyprosopon sp.: Hensley, 1986: 858.

Engyprosopon mozambiquensis Hensley, 2003: 834 (type locality: Porto Amelia, Mozambique, 13°00'S, 40°35'E).

Material examined. NMMB-P22218, 11 males, 49.8–67.0 mm SL, 3 females, 47.3–48.1 mm SL, Ke-tzu-liao, Kaohsiung, southwestern Taiwan, 10 Apr. 2015.

Diagnosis. Gill rakers with spines; large maxilla (2.21–2.43 in HL) extending to vertical through anterior 1/3 to 1/2 of lower eye; interorbital width narrow in both sexes, that of males wider than width found in females and juveniles; ocular-side pectoral fin filamentous, greatly elongate in males; ocular-side pectoral fin with two dark

cross bands; ventral margin of ocular-side lower jaw with 3 distinct black spots, the posteriormost especially distinct.

Description. Dorsal-fin rays 79–84, anal-fin rays 57–64, ocular-side pectoral-fin rays 10–12, blind-side pectoral-fin rays 8–9, caudal-fin rays 3 + 11 + 3, ocular-side pelvic-fin rays 6, blind-side pelvic-fin rays 6, scales in lateral line 46–52, gill rakers 0 + 6–7, vertebrae 10+24–25.

In SL: HL 3.45–3.83, body depth 1.92–2.21. In HL: snout 4.07–4.68, upper eye diameter 2.96–3.50, lower eye diameter 2.94–3.55, interorbital width 7.70–14.4 in males, 27.4–27.6 in females, ocular-side upper jaw 2.21–2.43, blind-side upper jaw 2.17–2.40, ocular-side lower jaw 1.68–1.90, blind-side lower jaw 1.68–1.87, caudal peduncle depth 2.15–2.75, ocular-side pectoral fin 0.58–0.88 in males, 1.23–1.38 in females, blind-side pectoral fin 1.75–2.14, ocular-side pelvic fin 1.90–2.98, blind-side pelvic fin 1.90–2.91, base of ocular-side pelvic fin 2.19–2.87, base of blind-side pelvic fin 5.84–9.13, longest dorsal fin ray 1.69–2.29, longest anal fin ray 1.94–2.23, middle caudal fin ray 1.12–1.38.

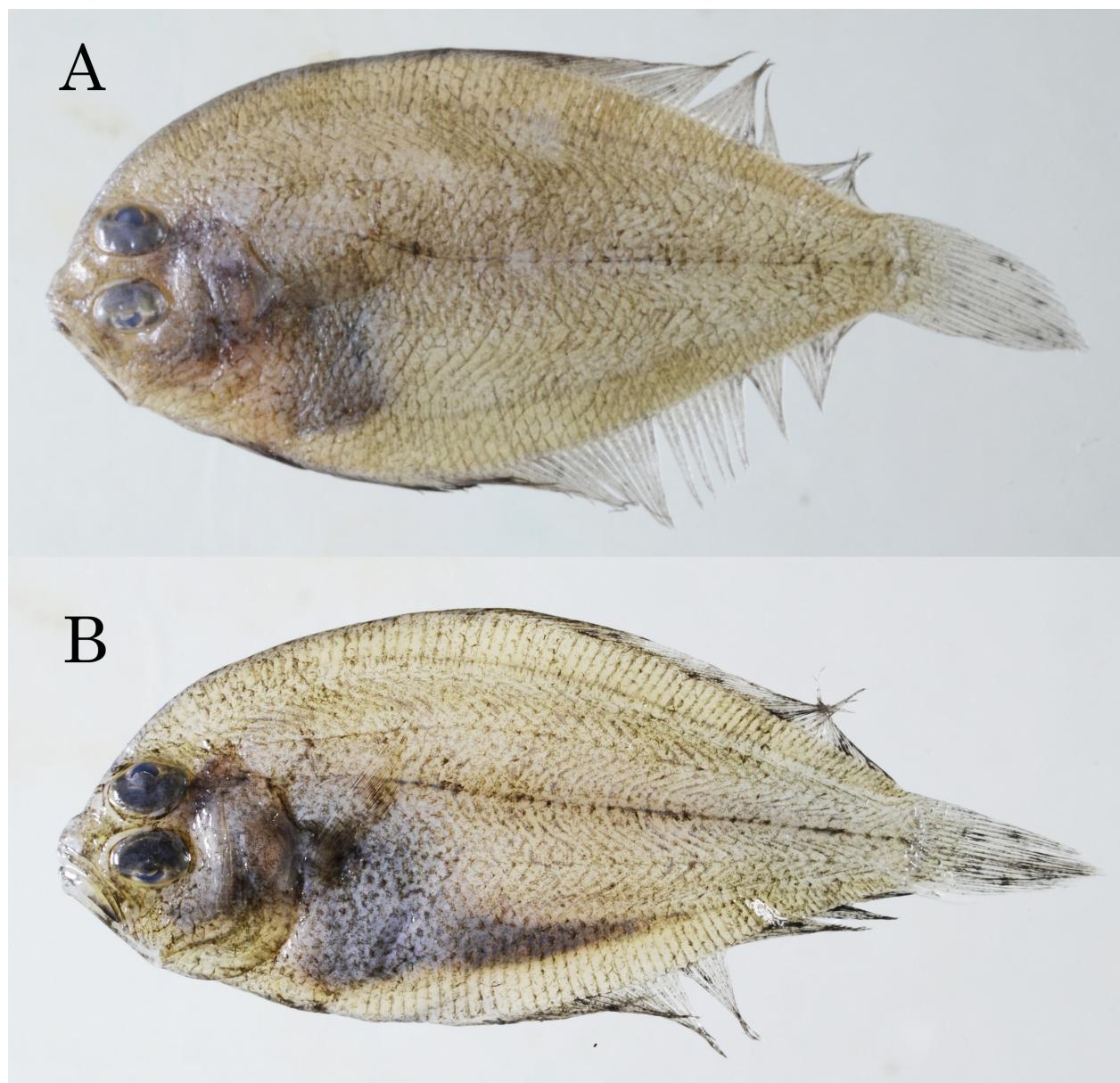


FIGURE 13. *Engyprosopon mozambicense* Hensley, 2003. Ocular side, A. NMMB-P22218, male, 58.8 mm SL. B. NMMB-P22218, female, 47.6 mm SL.

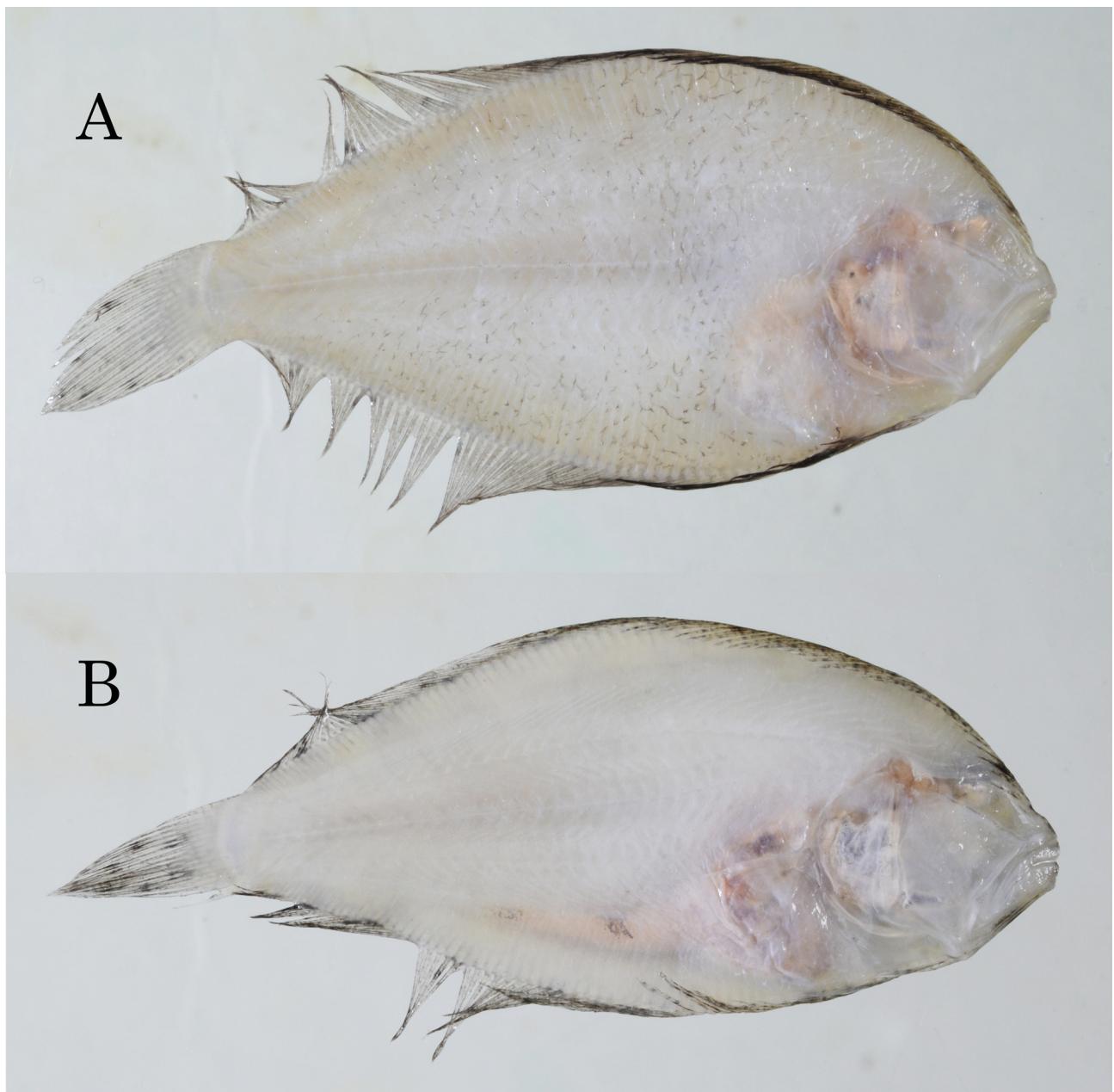


FIGURE 14. *Engyprosopon mozambiquense* Hensley, 2003. Blind side, same specimens as those in Figure 12.

Body ovate, deepest at middle of body, its depth about 1/2 of SL; dorsal and ventral contours gently arching with gradual posterior taper. Caudal peduncle less than 1/4 of body depth. Head large, its length more than 1/4 of SL, upper profile gently arched with shallow notch anterior to interorbital area; upper profile steep in mature males, not so in females and juveniles. Snout round, much shorter than eye diameter. A short, obtuse rostral spine on snout in males; spine absent in females. Eyes small; eye diameter much less than upper jaw length; anterior margins of both eyes on about same vertical line. Interorbital region very narrow, concave, becoming wider with growth, and wider in males than in females and juveniles (Fig. 19A).

Mouth large, oblique, maxilla extending to vertical through anterior 1/3 to 1/2 of lower eye; anterior tips of both jaws almost on same line when mouth closed. Teeth on upper jaw uniserial, some anterior teeth somewhat larger and stronger; lower jaw teeth uniserial, almost all of same size, similar in size to anterior upper teeth. Gill rakers on first arch flattened and slender (Fig. 15), distal part of inner margin with some small teeth; no gill rakers on upper limb. Ocular-side scales large, ctenoid with short ctenii, highly deciduous; snout and both jaws naked; cycloid scales on blind side.

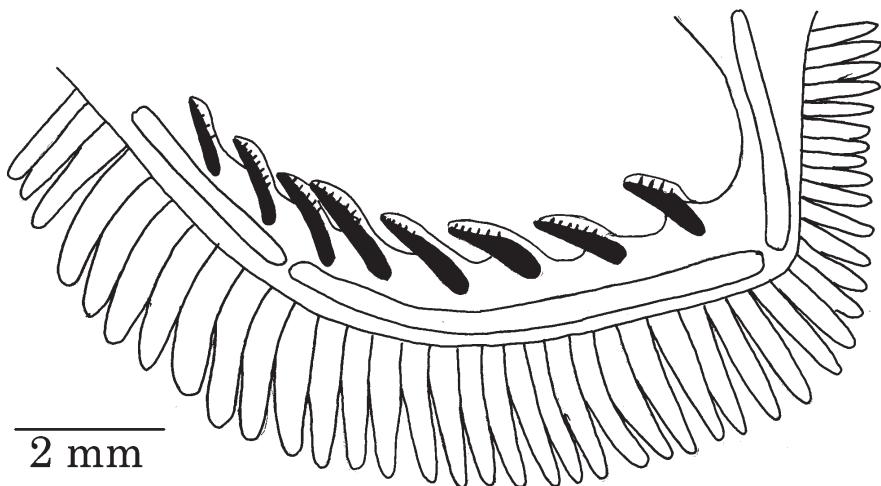


FIGURE 15. *Engyprosopon mozambiquense* Hensley, 2003. Gill rakers on first arch from NMMB-P22218.

Dorsal-fin origin on blind side ventral to concavity on dorsal margin, no elongate rays. Anal-fin origin below pectoral fin base. Ocular-side pectoral fin greatly elongated into filament in males, second ray longest, much longer than head length; ocular-side pectoral fin shorter than head length in females (Fig. 19B). Ocular-side pelvic-fin origin at tip of isthmus; ocular-side fourth or fifth ray opposite to first ray of blind-side fin. Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched, except for three upper- and three lowermost rays.

Coloration in alcohol. Ground color on ocular side uniformly light brown, scattered with numerous, small, indistinct dark dots on body: two distinct dark spots on lower jaw, anterior one on symphysial portion of lower jaw, posterior one near posterior end of jaw; dark band from middle of lower eye, crossing upper jaw and extending to lower jaw; blind side of body more or less dark in males, uniformly yellowish white in females. Dorsal and anal fins with a series of dark spots; caudal fin with irregularly scattered dark spots; ocular-side pectoral fin with two dark cross bands, lower band wider than upper.

Sexual dimorphism. This species shows sexual dimorphism in presence or absence of a rostral spine, interorbital width, curve on anterior dorsal profile of the head, the length of the ocular-side pectoral fin, and in coloration of the blind side of the body.

Distribution. Widespread in the Indo-West Pacific Ocean: Taiwan, Philippine Islands, Indian Ocean (Mozambique, northern Madagascar, India, Burma, Nicobar Islands and Cocos Islands), and Coral Sea (KA, pers. data). Bathymetric range 8–90 m (Hensley, 2003).

Remarks. The present species, described by Hensley (2003), was previously misidentified as *E. cocosensis* by Norman (1927, 1934) and Hensley & Amaoka (2001). Hensley (2003) found that the holotype of *E. cocosensis* has palmate gill rakers and a lure on the first dorsal-fin ray, these are unique characters to members of the genus *Asterorhombus*.

Engyprosopon mozambiquense belongs to a species group in *Engyprosopon* with serrate gill rakers. It is easily discriminated from congeners of the group in having the combination of some dark spots on the caudal fin, 3 black spots on the ventral margin of the ocular-side lower jaw, two dark cross bands on the ocular-side pectoral fin, a large mouth (length of ocular-side maxilla about 2.2–2.4 in HL), and narrower interorbital width compared with respective features of other species (when compared between same sexes and same sizes). This species is widely distributed in the Indian Ocean, Coral Sea, and the Philippine Islands. This is the first record of *E. mozambiquense* from the waters of Taiwan, and is also the northernmost record for this species.

TABLE 3. Comparison of proportional measurements and counts between *Engyprosopon brevifrontale* sp. nov. and 4 similar species. Numbers in bold show differences between *E. brevifrontale* sp. nov. and each similar species. M = male(s); F = female(s); O = ocular side; B = blind side; H = Holotype; P = Paratype; L = Lectotype; PL = Paralectotype.

| Taxon | <i>E. brevifrontale</i> sp. nov. | <i>E. vanuatuense</i> | <i>E. xanandrus</i> | <i>E. filimanus</i> | <i>E. maldivense</i> |
|-------------------------|-------------------------------------|--|---------------------|-------------------------|--|
| | H+P | H+P | H+P | L+PL | Non-types |
| SL (mm) (n) | 85.8–93.5 (2M) | 41.1–55.8 (9M), 41.2–48.0 (6F) | 52.5–71.5 (2M) | 57.7 (1M), 39.3 (1F) | 91.8–180.5 (6M), 71.1–102.7 (7F) |
| In SL | | | | | |
| Head length | 3.65–3.77 | 3.09–3.49 | 3.50–3.60 | 3.64–3.72 | 3.68–4.42 |
| Body depth | 1.67–1.73 | 1.83–2.04 | 1.93–2.02 | 1.91–1.94 | 1.82–2.10 |
| In head length | | | | | |
| Snout length | 4.77–5.34 | 4.08–6.18 | 3.77–4.84 | 3.97–4.15 | 3.78–5.20 |
| Upper-eye diameter | 2.73–2.88 | 2.29–2.55 | 2.88–3.10 | 3.30–3.38 | 3.12–3.96 |
| Lower-eye diameter | 2.82–3.09 | 2.20–2.55 | 2.73–3.13 | 3.44–3.48 | 3.09–4.16 |
| Interorbital width | 2.87–3.18 | 4.90–11.64 (M), 10.71–25.2 (F) | 3.03–3.85 (M) | 3.88 (M), 8.31 (F) | 1.65–2.31 (M), 2.72–3.89 (F) |
| Upper-jaw length (O) | 2.56–2.67 | 2.33–2.63 | 2.44–2.46 | 2.77–2.92 | 2.62–2.46 |
| Upper-jaw length (B) | 2.28–2.58 | 2.20–2.62 | 2.34–2.78 | 2.82–2.92 | 2.56–2.73 |
| Lower-jaw length (O) | 2.10–2.14 | 1.90–2.15 | 1.85–1.98 | 2.16–2.21 | 2.12–2.46 |
| Lower-jaw length (B) | 1.92–2.10 | 1.79–1.99 | 1.76–1.89 | 2.00–2.09 | 1.99–2.18 |
| Caudal-peduncle depth | 2.24–2.25 | 2.46–3.02 | 2.41–2.42 | 2.12–2.15 | 1.74–2.13 |
| Pectoral-fin length (O) | 0.48–0.64 | 0.50–0.99 | 1.47–1.49 | 1.16 | 0.43–0.79 |
| Pectoral-fin length (B) | 1.62–1.77 | 1.78–2.34 | 1.98–2.05 | – | 1.56–2.00 |
| Counts | | | | | |
| Dorsal-fin rays | 83–85 | 85–93 | 86–87 | 85–86 | 85–94 |
| Anal-fin rays | 64–67 | 64–70 | 65–66 | 62–63 | 63–69 |
| Pectoral-fin rays (O) | 12 | 11–13 | 12–13 | 13 | 10–12 |
| Pectoral-fin rays (B) | 9 | 9–10 | 10–11 | 9–11 | 9–11 |
| Lateral-line scales | 43–43 | 43–47 | 47–50 | 40–42 | 44–48 |
| Gill rakers | 0+9–10 | 0–3+13–14 | 0+11–12 | 0+6–7 | 0–3+9–11 |
| Vertebrae | 10+25 | 10+25–26 | 10+26 | 10+23–25 | 10+25–26 |
| Morphology | | | | | |
| Upper-jaw teeth | biserial | biserial | uniserial | uniserial | biserial |
| Gill rakers | not serrated | not serrated | not serrated | not serrated | not serrated |

Engyprosopon parvipectoralis sp. nov.

Figures 16–19; Tables 2, 4

Holotype. NMMB-P22220, male, 67.8 mm SL, Ke-tzu-liao, Kaohsiung, southwestern Taiwan, northern South China Sea, bottom trawl, ca. 30–100 m, 10 Apr. 2015.

Paratypes. NMMB-P25747 and 25748, 2 females, 61.9–64.6 mm SL, collected with the holotype; NMMB-P24736, male, 63.3 mm SL, Dong Gang, Kaohsiung, bottom trawl, 29 Sep. 2016; NMMB-P26188, 1 male and 1 female, 58.7 mm SL and 55.6 mm SL, Ke-tzu-liao, Kaohsiung, bottom trawl, 6 Apr. 2017.

Diagnosis. A species of *Engyprosopon* characterized by the combination of serrate gill rakers, large head (3.1–3.4 in SL); extremely narrow or almost ridge-like interorbital in both sexes; ocular-side pectoral fin distinctly short, 1.4–1.6 times in HL in both sexes; and no rostral or orbital spines in either sex (Fig. 18A).

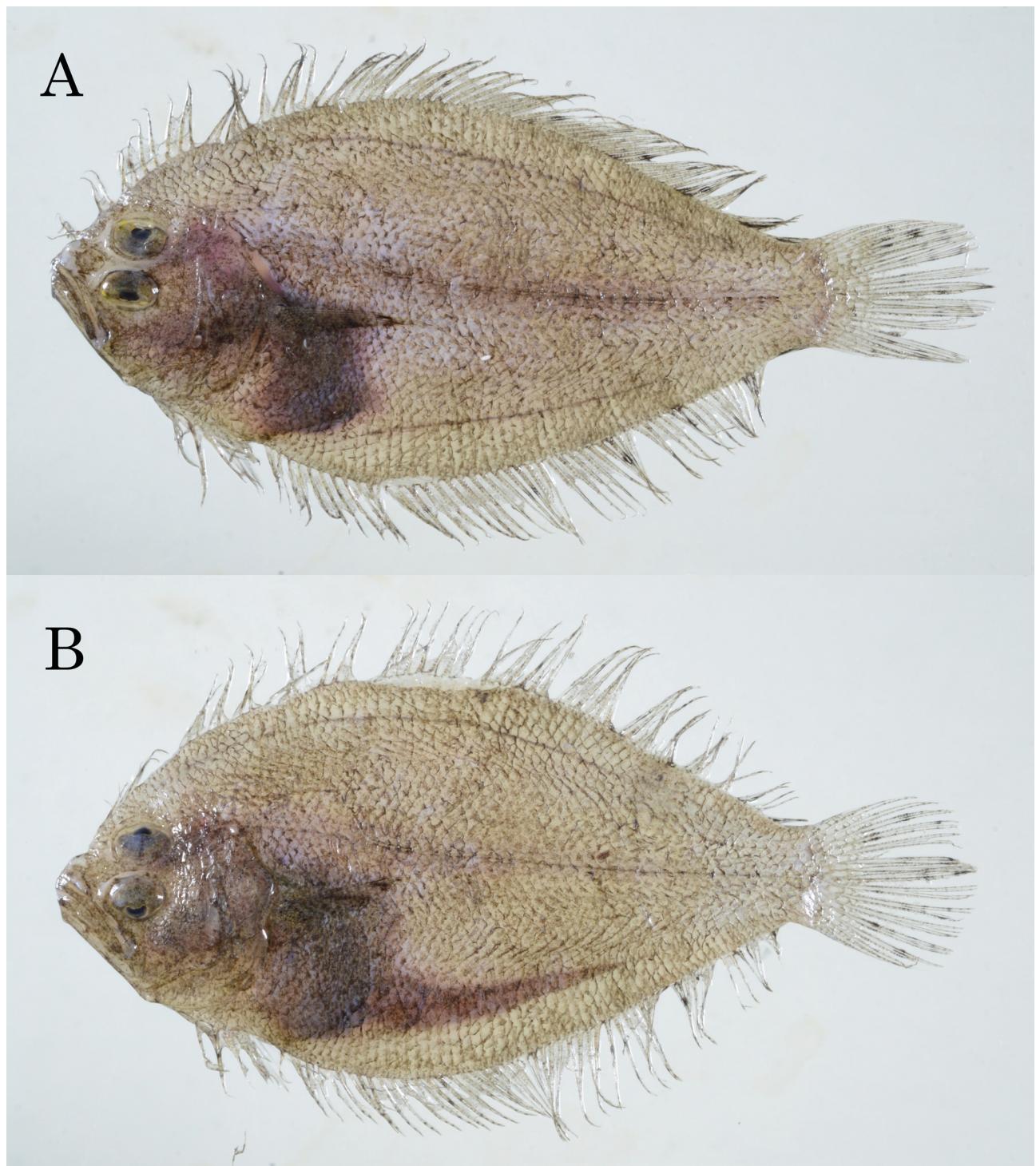


FIGURE 16. *Engyprosopon parvipectoralis* sp. nov. Ocular side, A. NMMB-P22220, holotype, male, 67.8 mm SL. B. NMMB-P25747, paratype, female, 64.6 mm SL.

Description. Data for the holotype are followed by those for the paratypes in parentheses.

Dorsal-fin rays 80 (78–84), anal-fin rays 58 (60–61), ocular-side pectoral-fin rays 12 (10–14), blind-side pectoral-fin rays 9 (8–10); caudal-fin rays 3 + 11 + 3 (2–3 + 11–12 + 3); ocular-side pelvic-fin rays 6 (6), blind-side pelvic-fin rays 6 (6), scales in lateral line 51 (49–52), gill rakers 0 + 7 (0 + 6–8), vertebrae 10 + 25 (10 + 24–10 + 25).

In SL: HL 3.34 (3.12–3.44), body depth 2.01 (1.91–2.01). In HL: snout 4.28 (3.98–4.83), upper eye diameter 4.31 (3.75–4.31), lower eye diameter 4.11 (3.93–4.38), interorbital width 33.8 (27.5–67.7), ocular-side upper jaw

2.19 (2.02–2.26), blind-side upper jaw 2.17 (1.98–2.21), ocular-side lower jaw 1.74 (1.62–1.75), blind-side lower jaw 1.71 (1.51–1.68), caudal peduncle depth 2.30 (2.30–2.48), ocular-side pectoral fin 1.53 (1.40–1.62), blind-side pectoral fin 2.16 (2.07–2.48), ocular-side pelvic fin 2.33 (2.09–2.80), blind-side pelvic fin 2.39 (2.46–2.81), base of ocular-side pelvic fin 2.71 (2.58–2.85), base of blind-side pelvic fin 8.46 (7.50–9.71), longest dorsal fin ray 2.26 (2.06–2.39), longest anal fin ray 2.27 (1.94–2.33), middle caudal fin ray 1.34 (1.30–1.45).

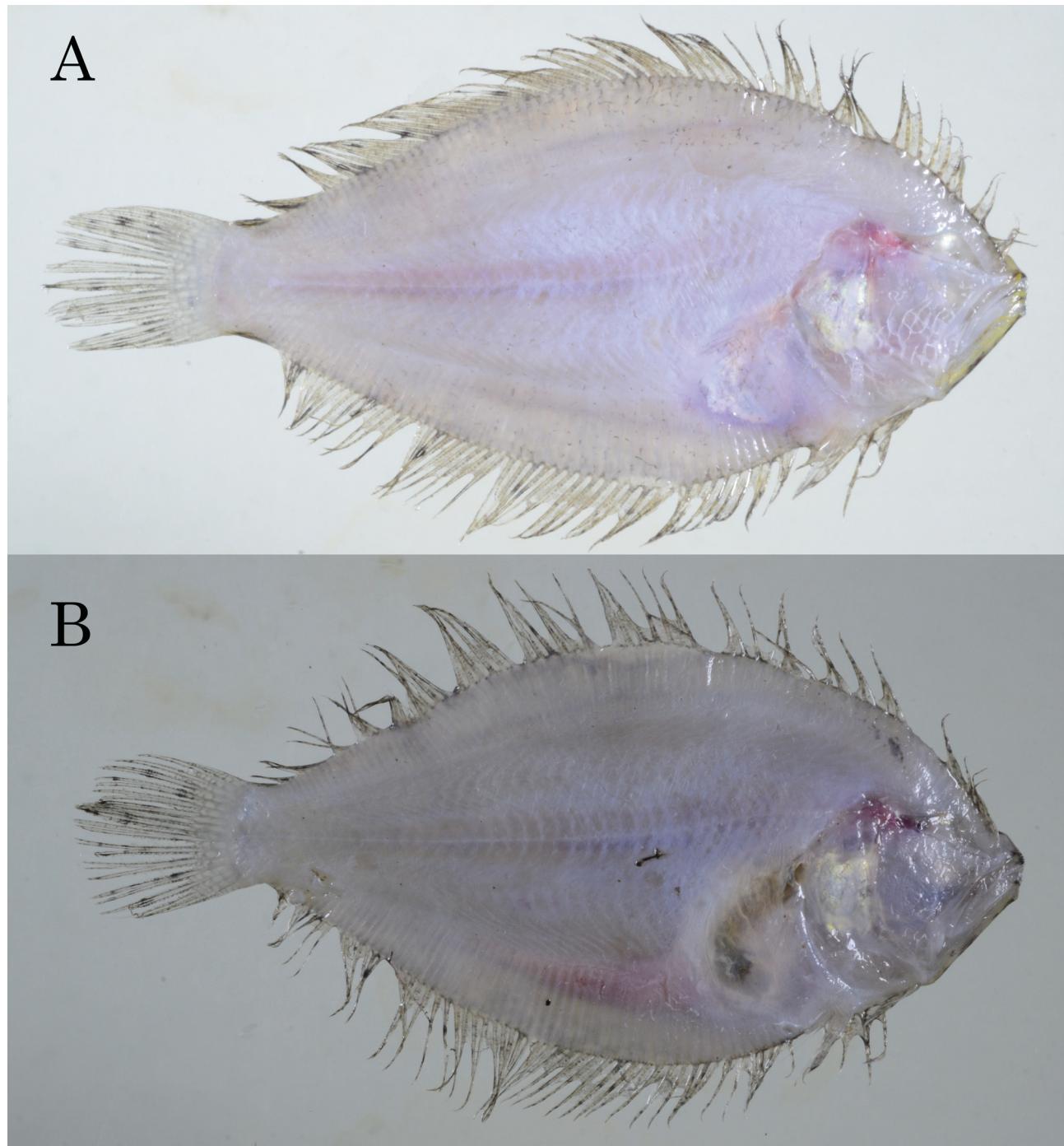


FIGURE 17. *Engyprosopon parvipectoralis* sp. nov. Blind side, same specimens as those in Figure 15.

Body moderately ovate, deepest about at anterior 1/3 of body; body depth about 1/2 of SL; dorsal and ventral contours nearly symmetrical, with gradual posterior taper. Caudal peduncle slightly greater than, or about equal to 1/4 of body depth. Head large, its length greater than 1/4 of SL; upper profile with small concavity anterior to middle of upper eye. Snout short, about equal to eye diameter. No rostral spine in males or females. Eyes small; eye diameter more than one-half of maxilla length; lower eye slightly in advance of upper eye. No orbital spine in

either sex. Interorbital space very narrow, concave or almost ridge-like, no distinct differences in interorbital width between sexes (Fig. 19A). Ocular-side nostrils anterior to interorbital region; anterior nostril a short tube with small round flap posteriorly, posterior nostril without flap; blind-side nostrils rudimental or absent, closely set below origin of dorsal fin.

Mouth large, oblique; maxilla extending to below middle of lower eye; anterior tip of upper jaw beyond tip of lower jaw when mouth closed. Teeth on upper jaw uniserial, rather strong, anterior 4–6 enlarged, canine-like; lower jaw teeth uniserial, canine anteriorly, strong conical laterally, stronger than upper lateral teeth; anterior teeth on upper jaws extruded beyond tip of lower jaws (Fig. 18A). Gill rakers on first arch short and flattened, inner margin of each raker with 2–5 stout spines, no gill rakers on upper limb (Fig. 18B). Ocular-side scales ctenoid with short ctenii, moderate and deciduous; tips of both jaws and ocular side of snout naked; scales cycloid on blind side.

Dorsal-fin origin on blind side below concavity in dorsal margin, no elongate rays. Anal-fin origin below pectoral-fin base. Ocular-side pectoral fin short, about 1.40–1.62 times in head length in both sexes; length of ocular-side pectoral fin less than about 2 times that of blind-side fin. Ocular-side pelvic-fin origin at tip of isthmus, fifth ray of ocular-side fin opposite to first ray of blind-side fin. Tip of isthmus near vertical line through middle of lower eye. Caudal-fin rays branched, except for three upper- and three lowermost rays.

Coloration in alcohol. Body light brown with many dark spots on lateral line; ventral half of lower jaw black in males and with 3 black spots in females; area of upper gill opening in region just below pectoral-fin base dark; posterior 1/3 of dorsal and anal fins with numerous black spots, and also with 3 or 4 spots on posterior part of these fin bases; ocular-side pectoral fin with dark band crossing at middle and distal 1/4 of fin; caudal fin with many small black spots; a pair of spots in middle slightly more distinct compared with others. Blind side of body yellowish-white in males and females.

Sexual dimorphism. This species shows no clear sexual dimorphism in interorbital width, rostral spine development or coloration on the blind side of the body.

Distribution. Known from the types collected from Ke-tzu-liao, Kaohsiung, southwestern Taiwan, at depths around 30–100 m.

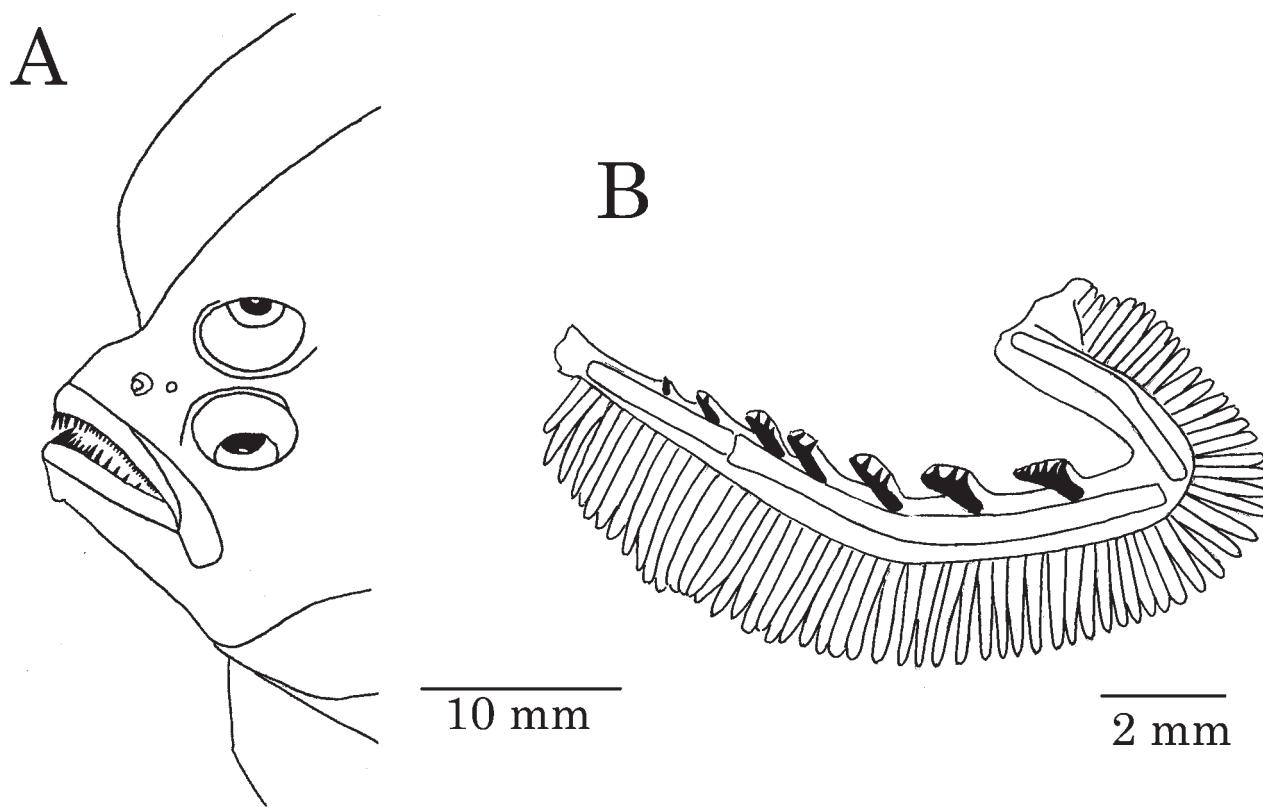


FIGURE 18. *Engyprosopon parvipectoralis* sp. nov. A. Ocular-side teeth on both jaws, B. gill rakers on first arch, from NMMB-P25747.

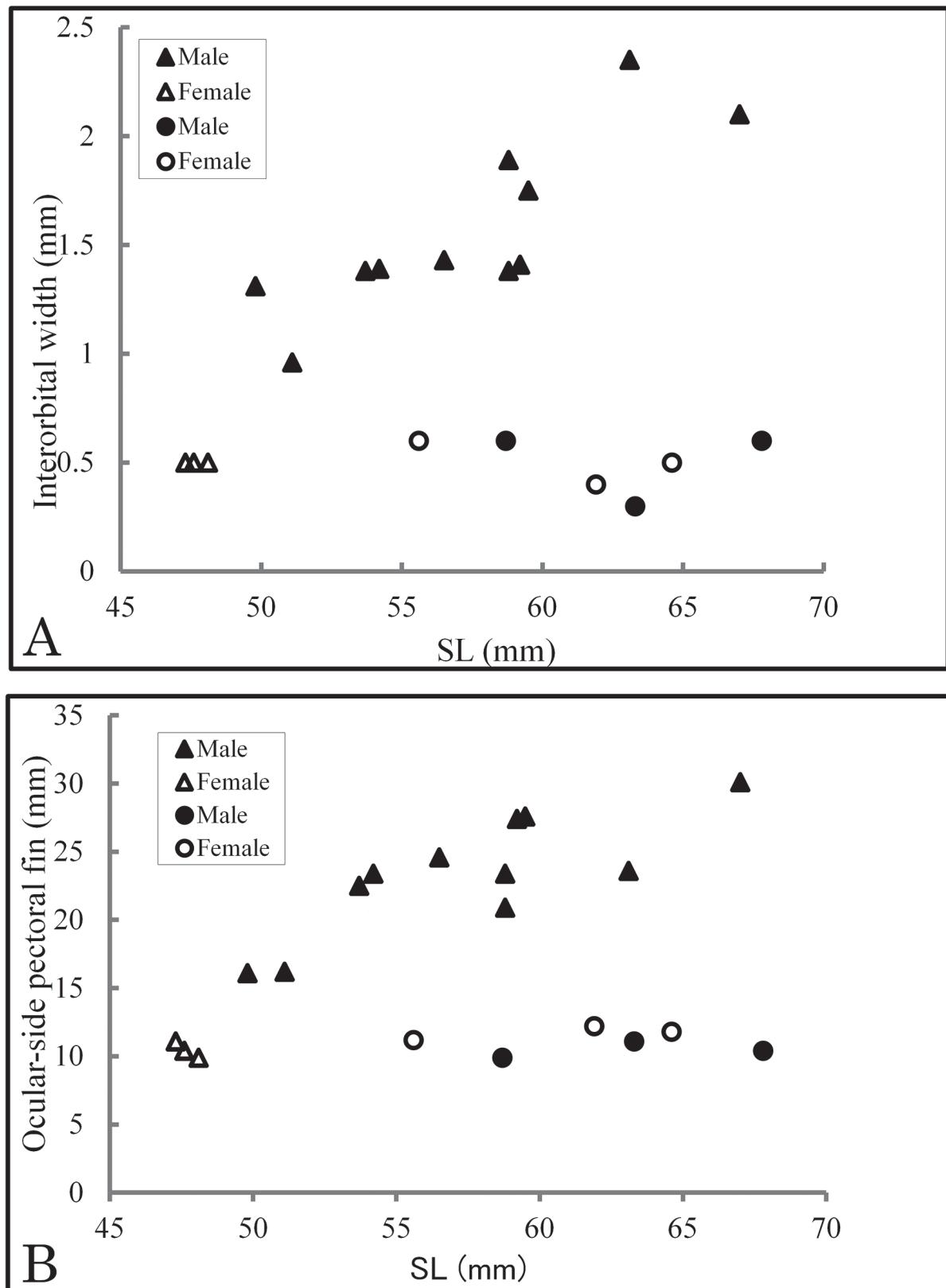


FIGURE 19. Relationship between SL and interorbital width (A), and ocular-side pectoral fin length (B) in *Engyprosopon mozambiquense* (triangles) and *Engyprosopon parvipectorale* sp. nov. (circles).

TABLE 4. Comparison of proportional measurements and counts between *Engyprosopon parvipectoralis* sp. nov. and *E. mozambiquense*. Numbers in bold numbers show differences between *Engyprosopon parvipectoralis* sp. nov. and *E. mozambicensis*. M = male(s); F = female(s); O = ocular side; B = blind side.

| Taxon | <i>E. parvipectoralis</i> sp. nov. | <i>E. mozambiquense</i> |
|---------------------------------|------------------------------------|-------------------------------------|
| | Holotype+paratypes | Non-types |
| SL (mm) (n) | 58.7–67.8 (3M), 55.6–64.6 (3F) | 49.8–67.0 (11M), 47.3–48.1 (3F) |
| In SL | | |
| Head length | 3.12–3.44 | 3.45–3.83 |
| Body depth | 1.91–2.01 | 1.90–2.21 |
| In head length | | |
| Snout length | 3.98–4.83 | 4.07–4.68 |
| Upper-eye diameter | 3.75–4.31 | 2.96–3.60 |
| Lower-eye diameter | 4.09–4.15 | 2.94–3.55 |
| Interorbital width | 28.5–67.7 (M); 27.5–45.0 (F) | 7.70–14.4 (M); 16.4–27.6 (F) |
| Upper-jaw length (O) | 2.02–2.26 | 2.21–2.43 |
| Upper-jaw length (B) | 1.98–2.21 | 2.17–2.40 |
| Lower-jaw length (O) | 1.62–1.75 | 1.68–1.90 |
| Lower-jaw length (B) | 1.51–1.71 | 1.68–1.87 |
| Caudal-peduncle depth | 2.30–2.48 | 2.15–2.67 |
| Pectoral-fin length (O) | 1.40–1.57 (M); 1.47–1.62 (F) | 0.58–0.88 (M); 1.23–1.38 (F) |
| Pectoral-fin length (B) | 2.07–2.48 | 1.75–2.14 |
| Length of middle caudal-fin ray | 1.30–1.45 | 1.12–1.38 |
| Counts | | |
| Dorsal fin rays | 78–84 | 79–84 |
| Anal fin rays | 58–61 | 57–64 |
| Pectoral fin rays (O) | 10–14 | 10–12 |
| Pectoral fin rays (B) | 8–10 | 8–9 |
| Scales in lateral line | 49–52 | 46–52 |
| Gill rakers | 0+6–8 | 0+6–8 |
| Vertebrae | 10+24–25 | 10+24–25 |

Remarks. This species well resembles *E. mozambiquense* in appearance and meristic features, but can be separated from the latter by its larger head (3.12–3.44 in SL vs 3.45–3.83), smaller eyes (upper eye 3.75–4.31 in HL vs 2.96–3.50, lower eye 3.93–4.38 vs 2.94–3.55), narrower interorbital width (27.5–67.7 in HL in both sexes vs 7.70–14.4 in males, 27.4–27.6 in females), longer blind-side upper jaw (1.98–2.21 in HL vs 2.17–2.40), and shorter ocular-side pectoral fin (1.40–1.62 in HL in both sexes vs 0.58–0.88 in males, 1.23–1.38 in females) (Table 4, Fig. 19B). In addition, *E. parvipectoralis* differs from *E. mozambiquense* in having some strong canine-like teeth anteriorly in both jaws (vs. no canine-like teeth), no sexual dimorphism in interorbital width (vs. width in males wider than that of females) and by its yellowish-white coloration on the blind side of the body in both sexes (vs. dark color in males). The extremely narrow, almost ridge-like, interorbital space and lack of sexual dimorphism, distinctly distinguishes this species from most of the known species of *Engyprosopon*.

Among congeners, *E. mogkii* lacks sexual differences in coloration of the blind side of the body, and also does not exhibit sexually dimorphic differences in interorbital width. However, it is apparent that this species, as well as *E. mogkii*, belongs to *Engyprosopon*, because both have a branched caudal skeleton and both lack a dorsal-fin lure and palmate gill rakers that characterize species of the genus *Asterorhombus* (Hensley, 2005).

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